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of

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for

**SYSTEM FOR INTERACTION WITH EXERCISE DEVICE**

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## **BACKGROUND OF THE INVENTION**

## **1. Field of the Invention**

This invention relates to exercise equipment and, more specifically, to systems and methods for providing improved exercise devices in combination with other users and/or a live or stored trainer via a communications network.

## 2. Related Patent Applications

This is a continuation-in-part application of co-pending patent application serial number 09/349,608, filed July 8, 1999 entitled "Systems and Methods for Providing an Improved Exercise Device with Motivational Programming" that is incorporated herein by reference. This application is also a continuation-in-part application of co-pending patent application serial 09/496,560 number, filed February 2, 2000 entitled "System and Method for Selective Adjustment of Exercise Apparatus" that is incorporated herein by reference.

### 3. The Relevant Technology

In an attempt to improve their health and physical conditioning, consumers are purchasing home exercise devices in record quantities. One common challenge with home exercise equipment is motivating the purchaser to use the device on a consistent and ongoing basis, while providing access to experienced trainers and individually developed exercise programs from the comfort of a user's own home. In addition, many exercise devices involve repetitive actions, which can quickly become tedious to a person exercising alone.

1 Health clubs, on the other hand, have organized various exercise classes and  
2 routines involving a group setting. In the proper setting, a group approach to exercise  
3 creates a synergy, whereby individual members of the class derive encouragement and  
4 motivation from other members of the group.

5 Furthermore, while individuals exercise at a health club they are taught the correct  
6 techniques for exercising, thereby reducing the possibility of being injured during an  
7 exercise program. In addition, group settings promote a healthy sense of competition  
8 among group members. Initially, such group fitness and exercise classes typically  
9 involved aerobics, traditionally performed without the use of any ancillary exercise  
10 equipment or devices. In recent years, however, the group work out approach has been  
11 extended to classes that utilize various exercise devices. Take, for example, the recent rise  
12 in popularity of "Spinning Classes," in which each participant operates his or her own  
13 stationery exercise cycle in a group setting, with a coach or instructor leading the group  
14 through a prescribed program or routine. Similarly, with recent advances in the design of  
15 treadmills, it is possible to have "Treadmill Classes" wherein an instructor not only leads  
16 the group, but the instructor is also able to control the operation of the treadmills of all of  
17 the class participants from a single control panel.

18 One of the primary disadvantages with group training, however, is that it is  
19 typically available only at health clubs and, therefore, is not as convenient as exercising in  
20 the privacy and comfort of one's own home. It would, therefore, be a definite advancement  
21 in the art of home exercise equipment to provide the desirable benefits of group exercise in  
22 a home setting. Some efforts have been made in the prior art to introduce a level of  
23 "interactivity" into exercise machines. For example, U.S. Patent No. 5,489,249 discloses a  
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1 video exercise control system in which a videocassette recorder (VCR) or similar device is  
2 coupled, via a hard wired connection, to an exercise machine, such as a treadmill. As an  
3 individual exercises on the treadmill, the VCR in synchronization with prerecorded  
4 audio/video presentations controls the speed and incline of the treadmill. U.S. Patent No.  
5 5,645,509, entitled "Remote Exercise Control System" that is incorporated herein by  
6 reference, discloses a remote exercise control system in which an exercise machine, such  
7 as a treadmill, may remotely communicate via a communications module with an  
8 evaluation module located at a remote location. Signals indicative of the operating  
9 parameters of the treadmill are transmitted from the treadmill to the evaluation module,  
10 and control signals are transmitted from the remote evaluation module for controlling the  
11 operating parameters of the treadmill. U.S. Patent No. 5,888,172 is representative of  
12 another, in which an exercise device is coupled, via hard wired connection, to a video  
13 game device, such that the operating parameters of the exercise device are used as inputs to  
14 the video game controller, which then produces a video display based on the inputs  
15 received. However, these approaches nevertheless fail to provide many desirable benefits  
16 of group exercise.

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2 OBJECTS AND SUMMARY OF THE INVENTION

3 It is an object of the present invention is to improve home exercise equipment by  
4 providing home exercise devices that are capable of simulating a group or class workout  
5 environment and synchronizing operation of the exercises devices with exercise  
programming.

6 It is an object of the present invention to provide an exercise device that is capable  
7 of being controlled by packetized signals received from a trainer.

8 It is another object of the present invention to provide an exercise device that is  
9 capable of enabling a user to communicate with a distantly located trainer.

10 It is yet another object of the present invention to provide an exercise device that  
11 communicates with a communication system that enables real-time communication with a  
12 trainer or alternatively access to one or more stored exercise programs.

13 Yet another object of the present invention is to provide an exercise system that  
14 enables one or more users to receive real-time signals from one or more trainers via a  
15 network.

16 Still yet another object of the present invention is to provide an exercise system that  
17 enables a third party to control one or more user exercise devices and one or more trainer  
18 exercise devices in real-time.

19 Another object of the present invention is to provide an exercise system that  
20 enables a user to access various exercise equipment and information from a variety of  
21 locations.

1 Still a further object of the present invention is to provide a system where one  
2 device is capable of controlling one or more operating parameters of one or more other  
3 devices.

4 Yet another object of the present invention is to provide a system where the various  
5 modules of the system may be incorporated within a variety of devices.

6 Another object of the invention is to provide exercise devices that incorporate  
7 modules for receiving and decoding control signals embedded in multimedia (*i.e.*, audio  
8 and/or video) programming for controlling various operating parameters of the exercise  
9 device in synchronization with the multimedia programming.

10 It is another object of the invention to provide exercise devices that are responsive  
11 to control signals that are encoded in programming external to the exercise device and  
12 containing audio and/or video and that can be transmitted and received by the exercise  
13 device.

14 Yet another object of the invention is to provide enhanced exercise devices, the  
15 operation of which can be controlled using interchangeable, multimedia programming  
16 containing control signals that is received via the Internet.

17 Yet another object of the invention is to provide an improved exercise machine that  
18 facilitates live, interactive communications between a treadmill user at home and a trainer  
19 or coach in a remote location, and which enables the trainer or coach to control the  
20 operating parameters of the user's treadmill on a live, real time basis.

21 The present invention is directed to devices, systems, methods, programs, computer  
22 products, computer readable media, and modules for controlling the operating parameters  
23 of one or more devices by one or more distantly located, or optionally closely located,

1 devices through the use of packetized data technology. The present invention is  
2 particularly well suited to devices that utilize one or more motors and/or other electrically  
3 driven actuators that control one or more operating parameters of a device, such as an  
4 exercise device.

5 In one embodiment, the exercise device is configured to enable a user to interact  
6 with a trainer in real-time communication and includes an exercise mechanism having a  
7 movable element for movement in performance of exercise by a user. One example of  
8 such an exercise device is a treadmill, although a variety of different exercise devices may  
9 be employed. By employing real-time communication and interaction with a trainer, an  
10 exerciser can interact with the trainer, thereby achieving many of the benefits of a group  
11 exercise session in a home environment.

12 The exercise device of the present invention may have a variety of different forms.  
13 However, in one exemplary embodiment, an exercise device configured to enable a user to  
14 interact with a trainer in real-time communication, comprises: (i) an exercise mechanism  
15 comprising a movable element; (ii) one or more user interface devices, that communicates  
16 with the exercise mechanism and gathers a first real time signal from the user; (iii) a  
17 communicating mechanism that communicates with the interface device and enables real-  
18 time transmission of the first signal to the trainer and receives a packetized second real-  
19 time signal. The second real time signal may comprise a variety of signals, such as control  
20 signal and/or audio and visual signals. A processor, responsive to a control signal is  
21 configured to control the operating parameters of the exercise mechanism in real-time.

22 Thus, according the present invention, it is possible for a user to exercise on a  
23 device, such as a treadmill, while a trainer receives data regarding the operating parameters  
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1 of the treadmill (and optionally of the user of the treadmill, e.g., heart rate), such as speed,  
2 inclination, etc. Upon receiving this data, the trainer can modify the operating parameters  
3 of the user's treadmill such that the user achieves an exercise program designed by the  
4 trainer. The trainer can also communicate in real time with the user without interrupting  
5 any control signals that control the treadmill or other exercise device. The user can also  
6 communicate with the trainer without affecting any of these controls during such  
7 communication.

8 A variety of different options are available for achieving the desired real time  
9 communication. According to one such option, a user can receive a broadcast from a live  
10 trainer (human being) or a stored trainer (e.g., a website, video, disk, or dynamic or  
11 interactive software program) upon activating the exercise device. As another option, the  
12 user can receive programming in response to a signal sent by the user. As yet another  
13 option, the trainer can analyze information about the exercise device (e.g., speed) and/or  
14 user (e.g., heart rate) and control the operating parameters of the exercise device and/or  
15 provide recommendations to the user through audio or video communication.

16 Thus, the present invention relates to an exercise device capable of achieving real  
17 time communication with either: (i) a live or (ii) stored trainer. The present invention also  
18 relates to an exercise system comprising: (i) one or more user devices, such as an exercise  
19 device; (ii) one or more trainer devices, such as another similar exercise device connected  
20 to each other in a master/slave relationship. Optionally, in addition to the master and slave  
21 devices, a third party can control the master and/or slave. Examples of such third parties  
22 include an individual located at a master control console that controls the master and/or  
23 slave, such as in the setting of a spinning class.

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1        The trainer and user may be linked in direct communication (e.g., master/slave) or  
2        indirect communication, such as by linking both the trainer and the user to a  
3        communication system that controls the operating parameters of an exercise device used by  
4        the user and/or trainer. For example, if both the trainer and the user devices are connected  
5        to a communication system, such as a website, the website may control the user device  
6        and/or the trainer device. Alternatively, the communication system may track changes of  
7        the operating parameters of the trainer device and modify the operating parameters of the  
8        user device based upon the changing parameters of the trainer device.

9        Optionally, a stored trainer (e.g., a website) controls a user device without requiring  
10      the services of a live trainer. The present invention also enables first and second users to  
11      compete against each other by connecting their corresponding exercise devices to a  
12      communication system, such as a website.

13      The present invention also relates to programming, computer products and  
14      computer readable medium including instructions designed to facilitate the above-  
15      described systems, inventions and exercises and other systems, devices, and exercises. As  
16      will be discussed in greater detail, the present invention is not limited to any particular  
17      device, although treadmills and other exercises are employed as examples to illustrate the  
18      operation and function of the present invention.

19      These advantages in addition to other objects and advantages of the invention will  
20      be set forth in the description which follows, and in part will be obvious from the  
21      description, or may be learned by the practice of the invention. The objects and  
22      advantages of the invention may be realized and obtained by means of the instruments and  
23      combinations particularly pointed out in the appended claims.

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## **BRIEF DESCRIPTION OF THE DRAWINGS**

In order that the manner in which the above recited and other advantages and features of the invention are obtained, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments thereof that are illustrated in the appended drawings. Understanding that these drawing depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

Figure 1 is an exercise system according to the teaching of the present invention;

Figure 2 is a perspective illustration of a reorienting treadmill with the tread base positioned in a first position for a user to perform exercises to be used in the exercise system of Figure 1;

Figure 3 is a perspective illustration of a reorienting treadmill of Figure 2 with the tread base positioned in a second or storage position;

Figure 4 is a partial plan view of portions of the reorienting treadmill illustrated in Figures 2 and 3 with the treadmill oriented in the second or storage position and with the bottom cover removed, revealing some of the internal components of the treadmill;

Figure 5 is a partial exploded perspective view of the incline mechanism incorporated into the treadmill illustrated in Figures 2 through 4;

Figure 6 is a perspective illustration of a control panel of the reorienting treadmill of Figure 2;

Figure 7 illustrates an exemplary computer and associated system that provides a suitable operating environment for the exercise system of Figure 1;

1       Figure 8 is a functional block diagram of a communication system of the exercise  
2       system of Figure 1;

3       Figure 9 is a functional block diagram of the treadmill and computer with  
4       associated translator box of Figure 1;

5       Figure 10 is a functional block diagram of the exercise system of Figure 1;

6       Figure 11 is a more detailed functional block diagram of the exercise system of  
7       Figure 10;

8       Figure 12 is a functional block diagram of the illustrative modules of the  
9       communication module;

10      Figure 13 is a flow diagram illustrative of process of gathering information through  
11      the login/registration module of Figure 12;

12      Figure 14 is a functional block diagram of illustrative modules of the audio  
13      program module of Figure 12;

14      Figure 15 a flow diagram illustrative of the process of selecting an audio program  
15      for a particular exercise device selected from those illustrated in Figure 14;

16      Figure 16 a functional block diagram of the illustrative modules and functions of  
17      the personal training module of Figure 12;

18      Figures 17A-D is flow diagrams representative of the processes a user performs  
19      using the competition module of Figure 12;

20      Figure 18 is a flow diagram representing the process of performing diagnostic on  
21      the treadmill of Figure 2 from a distant location;

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Figure 19 is a flow diagram representing the actions performed by the user and communication module to create audio and video programs in accordance with the teaching of the present invention;

Figure 20 is a functional block diagram of a master-slave system according to the teaching of the present invention.

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2        DETAILED DESCRIPTION OF THE INVENTION  
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4        The present invention is directed to devices that include one or more motors or  
5        other electrically driven actuators used to control one or more operating parameters of the  
6        device. While the invention will be described in the context of a motorized treadmill, it  
7        should be understood that the invention is not limited to any particular type of exercise  
8        device. To the contrary, the present invention can be readily adapted to any motorized  
9        device or any other device that utilizes motors, solenoids, or any other electrically driven  
10        actuators to control any operating parameter of the device, such as speed, resistance,  
11        incline, time, temperature, or other similar operating parameters. The term "device" or  
12        "devices" shall refer broadly to any type of apparatus that includes one or more stepper  
13        motors, solenoids, or other electrically driven actuators or controllers. Additionally, the  
14        term "exercise devices" shall refer broadly to any type of device that takes the form of an  
15        exercise machine, including, but not limited to, treadmills, exercise cycles, Nordic style ski  
16        exercise devices, rowers, steppers, hikers, climbers, and elliptical or striding exercise  
17        devices.

18        Depicted in Figure 1 is a representation of one illustrative system, designated by  
19        reference numeral 10, that may incorporate the novel features of the present invention,  
20        including various novel devices, hardware and software modules, and the like that may be  
21        remotely accessed and controlled in a real-time manner. As shown, one or more exercise  
22        mechanisms, such as a treadmill 12a-12n is in communication with one or more trainers at  
23        treadmill 20a-20n via a translator device 13 and a personal computer 14. The translator  
24        device 13 and personal computer 14 communicate with a network 16 that is a  
25        communication network that enables various hardware and software modules and devices

1 to communicate one with another. Network 16, therefore, may be a local area network  
2 (LAN), wide area network (WAN), wireless network, packetized network, real-time  
3 network, and the like. Network 16 facilitates communication of treadmill 12 with a live  
4 trainer on treadmill 20 and/or communication system 18 (e.g. a website). Communication  
5 system 18 assists communication between a user on treadmill 12 and either a live trainer  
6 on treadmill 20, or some other third party 21, as will be described in more detail  
7 hereinafter. Optionally, communication system 18 acts as a stored trainer or connects to a  
8 stored trainer.

9 The following discussion will be directed to only a single treadmill 12 and a single  
10 treadmill 20, however, it may be appreciated that a similar discussion may be had for  
11 multiple treadmills 12a-12n, 20a-20n. In addition, although only one of each element of  
12 system 10 is depicted, it may be appreciated by one skilled in the art that system 10 may  
13 have a mixture of both single and multiple elements, for example, at least one treadmill 12,  
14 20, translator device 13, personal computer 14, network 16, and communication system 18.  
15 Alternatively, one or more of the elements of system 10 may be eliminated or the  
16 functionality thereof incorporated within the structure and function of one or more of the  
17 other elements of system 10.

18 Similarly, although each of the elements of system 10 are shown separated one  
19 from another, it may be appreciated by one skilled in the art that the hardware and/or  
20 software elements of the present invention may be incorporated within two or more  
21 elements. For example, translator device 13 and personal computer 14 may be  
22 incorporated within treadmill 12. Similarly, the hardware and/or software elements of the  
23 communication system 18 may be incorporated within treadmill 20.

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1        As defined herein, the term "trainer" or "third party" 21 may include: (i) a live  
2        human being; or (ii) a stored trainer, such as a website, computer, optical media (e.g.,  
3        compact disk or digital video disk), visual media, or magnetic media (e.g., videotape,  
4        readable disk), an electronic monitoring system, dynamic computer readable instructions,  
5        interactive and/or dynamic software programs, computer readable instructions, and other  
6        media and hardware and/or software modules and components, whether or not the trainer is  
7        located at treadmill 20 or at some other location. In one embodiment, the third party is  
8        another trainer.

9        Generally, system 10 enables exercise programming with control signals to be  
10      transmitted from a trainer at treadmill 20, or alternatively from communication system 18,  
11      to a user at treadmill 12. As disclosed in U.S. Patent Serial No. 09/349,608 entitled  
12      "Systems and Methods for Providing an Improved Exercise Device with Motivational  
13      Programming," which is incorporated herein by reference, the programming may include  
14      motivational content and/or one or more control signals that may be used to control the  
15      operating parameters of treadmill 12 in real-time in an uninterrupted manner. The control  
16      signals may be synchronized with the motivational content and designed to control one or  
17      more operating parameters of the exercise device, such as the speed, incline, difficulty of  
18      exercise program, time, distance, and the like of an exercise program performed on  
19      treadmill 12.

20      As used herein, the term "motivational content" is used to broadly refer to any  
21      audio material, including dialog, narration, sound effects, and/or music, either alone or in  
22      combination with video material. In one embodiment of the present invention, the  
23      motivational content is stored in communication system 18 and includes an audio/video

1 presentation of a personal trainer and others engaged in a series of exercises of varying  
2 difficulty. In another embodiment of the present invention, the motivational content is a  
3 live-on-live, real-time exercise program presented by one or more personal trainers that is  
4 either specific to one particular user or alternatively broadcast or optionally "webcast" to  
5 any user that it may access communication system 18. In still yet another embodiment, the  
6 programming includes an exercise profile of the intensity of various exercise criteria, such  
7 as but limited to, speed, incline, or resistance of the exercise device, that is displayed  
8 continually or periodically to the user during the performance of the programming. In still  
9 yet another embodiment of the present invention, the user controls the period of when the  
10 exercise profile appears. One skilled in the art may appreciate that various other  
11 configurations of programming are applicable.

12 Generally, the second real-time signal may include both the motivational content  
13 and the control signals, whether or not such control signals are synchronized with the  
14 motivational content. Alternatively, the second real-time signal may include only the  
15 motivational content, other signals representative of measurable parameters of the exercise  
16 device (e.g. speed, inclination, resistance, etc) and/or a user of the exercise device (e.g.  
17 heart rate, blood pressure, etc), and the like. For example, treadmill 12 may transmit one  
18 or more signals to communication system 18. The signal may include parameters such as  
19 the status of the exercise device, e.g., active status (i.e., on), deactivated status (i.e., off),  
20 standby status (i.e., waiting), and the like, and/or parameters such as speed, inclination,  
21 resistance. Additionally, the signal may include parameters regarding the user, such as  
22 heart rate, blood pressure, and the like. Alternatively, treadmill 12 may receive  
23 programming "broadcast" by communication system 18 and/or a trainer at treadmill 20,

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1 such that any treadmill with the capabilities to receive the programming may access such,  
2 without the need to transmit one or more signals.

3 As mentioned above, the control signals control the operating parameters of  
4 treadmill 12, such as speed, inclination, resistance, and the like. Such control may be  
5 achieved by a trainer at treadmill 20, a combination of a trainer at treadmill 20 and  
6 communication system 18, or a third party 21 interacting with treadmill 20 and/or  
7 communication system 18. Generally, the present invention allows control of a device,  
8 such as an exercise device, without the need to interrupt the other portions of the  
9 programming, such as the real-time audio and/or video.

10 Figures 2 through 5 generally depict a typical motorized, reorienting treadmill 12.  
11 Although the discussion herein will be directed to treadmill 12, it may be appreciated by  
12 one skilled in the art that treadmill 20 may include all or a portion of the elements,  
13 modules, and means discussed herein

14 Treadmill 12, in one embodiment, includes a control panel 22 supported on a  
15 generally upright support structure 24 and a tread base 26. Upright support structure 24, in  
16 this illustrative embodiment, includes two side members 28, 30 coupled together by way of  
17 one or more cross members 32. Side members 28, 30 and cross members 32 may have  
18 various configurations and may be fabricated from various materials so long as they are  
19 capable of supporting control panel 22 and tread base 26. For example, the elements of  
20 upright support structure 24 may be fabricated from, but not limited to metals, plastics,  
21 composites, combinations thereof, and the like. Additionally, one skilled in the art may  
22 appreciate that various other exercise devices may have different upright support

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1 structures, side members, and cross members, or be devoid of one or more of such  
2 structures and members.

3       The tread base 26 typically includes a pair of side rails 34, 36 each having a front  
4 portion proximal to and a rear portion distal from upright support structure 24 when tread  
5 base 26 is in a downward exercisable position. As shown in Figure 4, a front pulley 38 and  
6 a rear pulley 40 are disposed between and supported by side rails 34, 36, while a  
7 continuous belt 42 extends between and around front and rear pulleys 38 and 40,  
8 respectively. Pulleys 38, 40 and belt 42 may have various configurations and be fabricated  
9 from various materials, as known by one skilled in the art and commonly known within the  
10 exercise industry.

11       A deck 44, commonly fabricated from wood, typically supports the upper run of  
12 belt 42 and supports an exercising individual resting upon belt 42. Although deck 44 is  
13 preferably of a cellulose material such as wood, various other types of material may be  
14 used so long as deck 44 is capable of supporting belt 42 and a user exercising thereupon.

15       As best seen in Figure 4, in one embodiment, front pulley 38 is mechanically  
16 coupled to an electric tread drive motor 46 by way of pulleys 48 and 50 and a drive belt 52.  
17 In this illustrative embodiment, motor 46 further incorporates an inertial flywheel 54 that  
18 controls fluctuations in the rotational motion of a shaft of motor 46 during operation of  
19 treadmill 12. Motor 46 is optionally electrically coupled to a treadmill controller 56 that  
20 controls the operation of motor 46, and thus the speed of belt 42, in response to various  
21 user inputs or other control signals. As shown, treadmill controller 56 is incorporated  
22 within tread base 26; however, it may be appreciated by one skilled in the art that treadmill

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1 controller 56 may be incorporated within control panel 22 or alternatively within personal  
2 computer 14.

3 In addition to the ability to control and vary the speed of belt 42, treadmill 12 also  
4 permits the degree of incline of tread base 26 relative to the floor, or other surface upon  
5 which tread base 26 rests, to be varied. Typically, this is accomplished through the use of  
6 an incline drive motor 60 that rises or lowers one end of tread base 26 relative to the other  
7 end. In the embodiment illustrated in Figures 2 through 5, tread base 26 includes a pair of  
8 rear feet 62 and 64 that are rotatably attached to the rear of portion of side rails 34, 36. As  
9 best seen in Figures 4 and 5, feet 62 and 64 are mechanically coupled through a shaft 66 to  
10 incline drive motor 60, which causes feet 62 and 64 to pivot about their points of pivotal  
11 attachment to side rails 34, 36, thereby selectively raising or lowering the rear end of tread  
12 base 26 relative to the front end thereof. Motor 60 is also optionally electrically coupled  
13 to, and controlled by the treadmill controller 56.

14 As shown in Figure 2, treadmill 12 (and optionally treadmill 20) includes control  
15 panel 22 attached to side members 28, 30 of upright support structure 24. Control panel  
16 22, in one embodiment, as shown in Figure 6, includes one or more interface devices.  
17 Such interface devices may be either input devices or output devices. Input devices enable  
18 a user to input and vary the operating parameters of treadmill 12. As examples of such  
19 input devices, control panel 22 includes many typical controllers for use on an exercise  
20 device, such as a treadmill. A number of illustrative input devices include but are not  
21 limited to speed controls 68, incline controls 70, time controls 72, distance controls 74, a  
22 start button 76, a stop or pause button 78, and heart rate controls 80. In addition to these  
23 input devices, such as one or more controllers, control panel 22 further optionally includes  
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1 an iFit.com button 82, a manual override button 84, and a scaling control 86, each of which  
2 are also examples of input devices. It may be appreciated that each of the above-recited  
3 controllers or buttons may be embodied in a variety of different manners to perform their  
4 commonly utilized function. In addition, each controller, button, and the like may take the  
5 form of one or more switches, rheostats, potentiometers, touch sensitive controls, voice  
6 activated controllers, and the like. The input devices described herein are examples of  
7 structures capable of performing the function of interface means for gathering a first signal  
8 (such as a real time signal) from the user. One skilled in the art may identify various other  
9 configurations of interface means that are capable of performing the desired function.  
10 Additionally, it may be appreciated that treadmill 20 may also include such interface  
11 means.

12 As shown in Figure 6, iFit.com button 82, in one embodiment, acts as both a  
13 selector and an indicator of connectivity of treadmill 12 to communication system 18, and  
14 optionally treadmill 20, whether such connectivity is via translator device 13, computer 14,  
15 or directly from treadmill 12. The iFit.com button 82 optionally includes an indicator light  
16 (not shown) that demonstrates when a connection has been established between treadmill  
17 12 and communication system 18, such as when iFit.com button 82 is depressed.  
18 Alternatively, a light emitting diode (LED) positioned in close proximity to iFit.com  
19 button 82 may be activated when iFit.com button 82 is activated.

20 The connection achieved by activating iFit.com button 82 may be via a variety of  
21 communication line connections. For example, as shown, control panel 22 includes a  
22 wireless port 105 that enables treadmill 12 to wirelessly communicate with network 16  
23 (Figure 1), either directly or via computer 14 and/or translator device 13. Alternatively,  
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1 wireless port 105 may be located on tread base 26. Various other types of port or interface  
2 may be included within treadmill 12 to enable communication via one or more  
3 communication line connections. For example, treadmill 12 may include one or more  
4 ports and interfaces to enable communication line connection through existing broadcast  
5 technology, including television broadcast over the airwaves, cable or cable modems,  
6 satellite, telephone lines, whether analog or digitally based, the internet, DSL, G-Lite,  
7 wireless technology, infra-red (IR) technology, other high-speed data connections, or any  
8 other suitable transmission technology or medium. Optionally, a communication port on a  
9 user treadmill may enable communication directly with another treadmill (such as in a  
10 master/slave scenario), whether or not such communication utilizes a network.

11 In one embodiment, by activating iFit.com button 82, a user of treadmill 12, or  
12 other exercise device, connects to communication system 18, such as a website. Such  
13 connection may be via an independently located computer, such as computer 14, through  
14 translator device 13 or directly through a local area network (LAN) or wide area network  
15 (WAN) by way of the described communication line connections for example, or other  
16 connections known to one skilled in the art.

17 More specifically, by activating the iFit.com button 82 a signal is transmitted to  
18 communication system 18 to create a connection therebetween. In this manner, treadmill  
19 12 may receive signals representative of exercise programming from communication  
20 system 18. Additionally, the connection with communication system 18 enables the user  
21 to obtain the services of a stored trainer or a personal trainer to perform programming, ask  
22 questions, download or access programming materials, surf the web, gather and send  
23 electronic mail messages ("e-mail"), listen to audio programming, view video

24

1 programming, review and update user information and statistics, load user statistics,  
2 purchase exercise programming, equipment, and materials, update exercise device software  
3 and operating parameters, research exercise materials, and the like.

4 Furthermore, activation of the connection with communication system 18 enables  
5 treadmill 12, or other exercise device, to have the potential of being controlled during an  
6 exercise program by a third party, whether that third party is another personal trainer using  
7 another treadmill 20, a stored communication system 18, or some other individual,  
8 hardware, or software modules or components. For example, a third party individual or a  
9 stored third party trainer may operate a console controlling the operation of one or more  
10 exercise devices in a group class setting, including devices operated by a live or stored  
11 trainer and by trainee users. This may be useful in a spinning class or other class in which  
12 a trainer trains trainee users. In one embodiment, as the third party controls the operation  
13 of the exercise devices, the trainer can communicate motivational messages to the trainee  
14 users.

15 Similarly, activation of the connection with network 16 and/or communication  
16 system 18 enables one or more users to interact one with another, and optionally compete  
17 one against another as shall be described in detail hereinafter. For example, a first user on  
18 treadmill 12a may receive information regarding the workout performed by a second user  
19 on treadmill 12n via network 16 and/or communication system 18, then compete against  
20 the second user and vice versa. This competition may be live on live or time adjusted, e.g.,  
21 a workout recorded previously by the second user which the first user competes against.  
22 Greater information about communication system 18, with its associated modules and  
23 components will be discussed in detail hereinafter.

24

1 As mentioned above, control panel 22 may include manual override button 84.  
2 Manual override button 84 enables a user to override an action initiated by (i) a live trainer  
3 or (ii) a stored trainer, such as communication system 18, stored programming that is  
4 located within the memory of computer 14, or alternatively in memory stored in treadmill  
5 12. For example, if the exercise program accessed through communication system 18 is  
6 too difficult for the user, the user may activate manual override button 84 thereby  
7 interrupting the program delivered to treadmill 12 by communication system 18.  
8 Furthermore, in the event that the exercise program is too easy, the user may increase the  
9 difficulty level of the exercise device. Consequently, manual override button 84 provides  
10 the user with a safety switch during operation of treadmill 12. In an alternate configuration  
11 of treadmill 12, the functionality of manual override button 84 is activated upon manual  
12 activation of one of the other input devices, such as but not limited to, incline controls 74,  
13 speed controls 76, stop/pause button 78, and the like.

14 Similar to the operation of manual override button 84, scaling control 86 enables a  
15 user to vary the operating parameters of treadmill 12 during an exercise program initiated  
16 externally to treadmill 12. A user may activate scaling control 86 and vary the intensity of  
17 an exercise program. The scaling control 86, therefore, enables a user to select a value  
18 representative of the proportional change to be made to the control signal received by the  
19 communicating mechanism of treadmill 12 from communication system 18. For example,  
20 if an exercise program requires a maximum speed of 6 miles per hour (mph) with a  
21 maximum incline of 15 degrees for a period of 30 minutes, an individual may activate  
22 scaling control 86 to require only 66% intensity of the exercise program; stated otherwise,  
23 reduce the intensity by one third. Therefore, the exercise program is varied to a maximum

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1 speed of 4 mph, with a maximum incline of 10 degrees, for a period of 20 minutes.  
2 Optionally, scaling control 86 may enable the user to set maximum values for each  
3 operating parameter of treadmill 12. In another configuration, scaling control 86 may  
4 enable the user to scale only one operating parameter of treadmill 12 while leaving other  
5 parameters unchanged. Hence, the user may vary the exercise program to their particular  
6 abilities, while obtaining the beneficial effects of exercising.

7 As another example of an input device of the present invention, control panel 22  
8 may include a diagnostic control 88. Upon activation of diagnostic control 88, whether by  
9 depressing a button or by some other manner known to one skilled in the art, treadmill 12  
10 communicates with communication system 18 to check the operating status of the exercise  
11 device. Communication system 18, thereby sends signals to the internal hardware and  
12 software modules of treadmill 12 to verify that the modules are operating within the  
13 desired specifications or to determine whether treadmill 12 may include software for which  
14 an update is available. In one embodiment, in the event that one or more of the hardware  
15 and/or software modules are damaged or not performing as required, communication  
16 system 18 may download one or more software updates from communication system 18 if  
17 possible. Alternatively, communication system 18 may inform the user that an error has  
18 occurred and advise that the user obtain maintenance of the hardware components of  
19 treadmill 12.

20 As additional examples of input devices, according to another aspect of the present  
21 invention, control panel 22 may include an audio input device 90 and a video input device  
22 92. Audio and video input devices 90, 92 enable a user to perform communication, such as  
23 real time communication, with other users of exercise devices, via communication system  
24

1 18 (Figure 1). The audio and video input devices 90, 92 also enable the user to hear and/or  
2 watch (i) a live trainer or (ii) a stored trainer, such as recorded programs, educational  
3 programming, entertainment programming, and the like. The diagnostic control 88, audio  
4 input device 90 and video input device 92, therefore, are structures capable of performing  
5 the function of interface means, communicating with the exercise mechanism, for  
6 gathering a first signal from the user. Various other configurations of such interface means  
7 are known to one skilled in the art in view of the teachings contained herein.

8 In one embodiment, audio input device 90 may take the form of a microphone,  
9 while video input device 92 may take the form of a video camera. Audio input device 90  
10 and video input device 92 may alternatively take various other configurations as known by  
11 one skilled in the art. For example, audio input device 90 may be a microphone detachable  
12 connected to control panel 22 or another part of treadmill 12. In another configuration,  
13 audio input device 90 may be located distant from treadmill 12, while being capable of  
14 gathering the audio inputs from the user. In still another configuration, audio input device  
15 90 may be eliminated from treadmill 12, while treadmill 12 includes an audio jack, such as  
16 an RCA-type audio jack, RJ-type jacks, digital audio jack, and the like. In still another  
17 configuration, audio input device 90 may be a radio frequency (RF), infra red (IR), or  
18 wireless type microphone. Similarly, video input device 92 may have the configuration of  
19 a digital video camera integrally formed within control panel 22. Alternatively, video  
20 input device 92 may be detachably connected to control panel 22 or another part of  
21 treadmill 12, such as wireless digital cameras. Still in another configuration, video input  
22 device 92 may be located distant from treadmill 12, while being capable of gathering the  
23 requisite video signals to be transmitted to communication system 18 (Figure 1).

24

1       In addition to the above-described audio and video input devices 90, 92  
2 respectively, control panel 22 may include a variety of other input devices. For example,  
3 control panel 22 may include an integrally formed mouse 100. Additionally, control panel  
4 22 may include a keyboard jack 102 for an external keyboard 103, a controller port 104 for  
5 receiving one of a variety of game controller, an integrally formed mouse 100, a touch-  
6 sensitive video display, and various other ports, jacks, or the like to receive various other  
7 external components. Each input device is adapted to allow a user operating treadmill 12  
8 to more fully operate one or more operating parameters of treadmill 12. Furthermore, the  
9 input devices enable the user to access communication system 18 and/or obtain  
10 educational, entertainment, or other information via network 16, whether such information  
11 is from communication system 18 or from one of a variety of other hardware and/or  
12 software modules that are accessible via network 16. For example, the input devices may  
13 allow the user to surf the Internet to find educational materials or entertainment. These  
14 additional input devices are further examples of structures capable of performing the  
15 function of interface means, communicating with the exercise mechanism, for gathering a  
16 first signal from the user.

17       Control panel 22, in one embodiment includes one or more output devices that  
18 provide a visual and optionally an audio indication of the operational status of treadmill 12  
19 to the user. As with the input devices, the output devices may have various configurations  
20 and perform numerous functions. Generally, the output devices described herein are each  
21 structures capable of performing the function of means for reproducing a signal. The  
22 output devices and hence the means for reproducing a signal may have various  
23 configurations as known to one skilled in the art in view of the teaching contained herein.

24

1 In one embodiment, one video output device 94 may be a video display. Generally, video  
2 output device 94 presents the user of treadmill 12 with information and data transmitted  
3 from communication system 18, whether such data is live transmission from treadmill 20,  
4 or alternatively stored programming accessible by communication system 18.  
5 Additionally, video output device 94 may optionally show information and data from: (1)  
6 various other sources selected by the user, third parties, or system 10; (2) statistical  
7 information representative of the operational parameters of treadmill 12, such as the speed,  
8 incline, duration of user's workout, etc.; (3) electronic mail messages (e-mail), and the like.  
9 Video output device 94, in one embodiment is a liquid crystal display (LCD) or cathode  
10 ray tube (CRT) display.

11 One skilled in the art may appreciate that various other devices may be used to  
12 perform the functions of video output device 94. For example, video output device 94  
13 maybe an electroluminescent display (ELD), a gas-plasma display, a thin film transistor  
14 (TFT) display, a virtual reality (VR) display, and the like. In another embodiment of the  
15 present invention, control panel 22 includes multiple video output devices 94. In still  
16 another embodiment, video output device 94 is adapted to permit split screen or layered  
17 images that are associated with picture-in-picture viewing of various images and  
18 information. For example, video output device 94 may allow a user to watch various types  
19 of entertainment and/or surf the Internet, while receiving images representative of the  
20 exercise profile that they are following whether continuously, periodically, upon activation  
21 of a user control, or the like.

22 As shown in Figure 6, in one embodiment of the present invention, control panel 22  
23 includes an audio output device 96, such as a speaker. Audio output device 96 performs a  
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similar function to that of video output device 94, in that audio output device 96 provides the user with audible signals representative of the operational parameters of treadmill 12. Additionally, audio output device 96 may deliver audio, visual, or control signals to the user from communication system 18 and treadmill 20. Such signals may be audible and/or inaudible signals transmitted from the trainer on treadmill 20. Various speakers are applicable and may operate as audio output device 96, for example, hardwired and wireless speakers, such as computer speakers, audio system speakers, and the like. Control panel 22 may optionally include one or more amplifiers in cooperation with audio output device 96. Furthermore, audio output device 96 may be circumvented through user of one of a variety of audio jacks that enable a user to listen to the audio output through headphones or similar audio transmitting device.

In addition to the output devices described above, the present invention may include various other output devices to provide information and data to the user of treadmill 12. In one embodiment of treadmill 12, control panel 22 includes one or more operating parameter displays. The one or more operating parameter displays give a visual display of some of the more important exercise device operating parameters, such as but not limited to, speed, incline, distance traveled, calories used, elevation climbed, wheel resistance, and the like. The one or more operating parameter displays may use a numerical display, a graphical display, combinations thereof, or such other displays known to one skilled in that art. For example, the operating parameter display may be incorporated within video output device 94.

As shown in Figure 1, communicating with treadmill 12 via personal computer 14 is communication system 18 and treadmill 20. Those skilled in the art will appreciate that

1 computer 14 may take various configurations, including personal computers, hand-held  
2 devices, multi-processor systems, microprocessor-based or programmable consumer  
3 electronics, telephones, network PCs, minicomputers, mainframe computers, and the like.  
4 Additionally, computer 14 may be part of a distributed computer environment where tasks  
5 are performed by local and remote processing devices that are linked (either by hardwired  
6 links, wireless links, or by a combination of hardwired or wireless links) through a  
7 communications network, such as network 16. Furthermore, as suggested earlier, treadmill  
8 12 may optionally incorporate the functionality of personal computer 14 therein or include  
9 one or more modules or components of computer 14 while not incorporating all the  
10 modules and components of computer 14.

11 The following discussion will focus on certain examples of alternate structures that  
12 may be used as computer 14; however it is understood that a similar discussion may be  
13 made for the hardware and/or software modules and components associated with  
14 communication system 18, treadmill 20, and/or a third party 21. Furthermore, it may be  
15 appreciated that treadmill 12, treadmill 20, communication system 18 and third party 21  
16 may incorporate portions of computer 14 as described herein and appreciated by one  
17 skilled in the art in light of the teaching contained herein. Similarly, one skilled in the art  
18 will recognize that treadmill 12 and/or communication system 18 may include some or all  
19 of the modules and components of computer 14.

20 Generally, computer 14 is configured to receive data from various portions of  
21 treadmill 12 and deliver manipulated data to the hardware and/or software modules or  
22 components associated with communication system 18 and/or treadmill 20 or other  
23 treadmills 12a-n. In addition, computer 14 communicates with communication system 18  
24

1 and retrieves audio, video, and control signals therefrom and provides these signals to  
2 treadmill 12, whether or not the signals are initiated solely by communication system 18,  
3 treadmill 20, a third party, or another treadmill 12a-12n. Computer 14 may, therefore, use  
4 various types of interfaces to communicate with treadmill 12 and network 16. For  
5 example, the interface may be a wireless interface thereby utilizing IR, RF, satellite, blue  
6 tooth transmission and associated protocols. Alternatively, the interface may be a modem,  
7 cable modem, ADSL connection, ISDN, Ethernet, or similar other connections, voice  
8 activated, and the like.

9 Following herein after is a general discussion of possible modules and components  
10 of computer 14. The following discussion is merely illustrative of modules and  
11 components that may form computer 14. It is appreciated that some of the referenced  
12 modules may be eliminated while other modules and components may be included within  
13 computer 14, as known by those skilled in the art.

14 With reference now to Figure 7, in one embodiment of the present invention  
15 computer 14 is a general-purpose-computing device, including a processing unit 110, a  
16 computer memory 112, and a computer bus 124 that couples various computer components  
17 including the computer memory 112 to the processing unit 110. The computer bus 124  
18 may be any of several types of bus structures including a memory bus or memory  
19 controller, a peripheral bus, and a local bus using any of a variety of bus architectures.  
20 Additionally, when treadmill 12 includes computer 14 and/or translator 13 computer bus  
21 124 may be an I<sup>2</sup>C bus, a SPI bus, a microwire bus, a microbus, and the like. Also,  
22 computer bus 124 may use the CAN protocol, CSAFE 1 protocol, or some other protocol

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1 known to one skilled in the art to allow communication between treadmill 12 and  
2 communication system 18 and/or treadmill 20 either directly or through network 16.

3 The computer memory, in this particular embodiment, includes read only memory  
4 (ROM) 126 and random access memory (RAM) 128. A basic input/output system (BIOS)  
5 130, containing the basic routines that help transfer information between elements within  
6 computer 14, such as during start-up, may be stored in ROM 126.

7 The computer 14 may also include a magnetic hard disk drive 132 for reading from  
8 and writing to a magnetic hard disk 138, a magnetic disk drive 134 for reading from or  
9 writing to a removable magnetic disk 140, and an optical disk drive 136 for reading from  
10 or writing to removable optical disk 142 such as a CD-ROM or other optical media. The  
11 magnetic hard disk drive 132, magnetic disk drive 134, and optical disk drive 136 are  
12 connected to computer bus 124 by a hard disk drive interface 144, a magnetic disk drive-  
13 interface 146, and an optical drive interface 148, respectively. The drives and their  
14 associated computer-readable media provide nonvolatile storage of computer-executable  
15 instructions, data structures, program modules, and other data for computer 14 as will be  
16 discussed in detail hereinafter. Although the exemplary environment described herein may  
17 employ a magnetic hard disk 138, a removable magnetic disk 140, and a removable optical  
18 disk 142, other types of computer readable media for storing data can be used, including  
19 magnetic cassettes, flash memory cards, digital video disks, Bernoulli cartridges, RAMs,  
20 ROMs, and the like.

21 Computer 14, in one embodiment, further includes program code means  
22 comprising one or more program modules that may be stored on hard disk 138, magnetic  
23 disk 140, optical disk 142, ROM 126 or RAM 128, including an operating system 150, one  
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1 or more application programs 152, other program modules 154, and program data 156. A  
2 user may enter commands and information into computer 14, in one embodiment, through  
3 a keyboard 160, pointing device 162, or other input devices (not shown), such as but not  
4 limited to microphones, joy sticks, game pads, satellite dishes, scanners, video cameras,  
5 potentiometers, buttons, switches, rheostats, or the like, whether such devices are  
6 incorporated within treadmill 12 or in communication with translator device 13 and/or  
7 computer 14. These and other input devices are often connected to processing unit 110  
8 through a serial port interface 164 coupled to computer bus 124. Alternatively, the input  
9 devices may be connected by other interfaces, such as a parallel port, a game port, or a  
10 universal serial bus (USB), and the like. A monitor 166 or another video display device,  
11 such as those described herein is optionally connected to computer bus 124 via an  
12 interface, such as video adapter 168. In addition to the monitor, personal computer 14 may  
13 include other peripheral output devices (not shown), such as one or more speakers, and  
14 printers for obtaining recent statistical information regarding the user's workouts.

15 The computer 14, as depicted in this illustrative embodiment, may operate in a  
16 networked environment using logical connections to one or more remote computers, such  
17 as remote computer 170. The computer 14 may also communicate with treadmill 12 via a  
18 LAN and optionally communicate with communication system 18 and treadmill 20 via a  
19 WAN and optionally remote computer 170. Generally, each remote computer 170,  
20 communication system 18, and treadmill 12, 20 may be or include the structure and  
21 perform the function of another personal computer, a server, a router, a network PC, a peer  
22 device, or other common network node, and typically includes many or all of the elements  
23 described above relative to computer 14, although only one memory storage device 172  
24

1 and its associated application program 174 has been illustrated in Figure 7. The logical  
2 connections depicted in Figure 7 include local area network (LAN) 176 and a wide area  
3 network (WAN) 178 that are presented here by way of example and not limitation. Such  
4 networking environments are commonplace in office-wide or enterprise-wide computer  
5 networks, intranets and the Internet.

6 When used in a LAN networking environment, typically computer 14 is connected  
7 to the local network 176 through a network interface or adapter 180 that communicates via  
8 one of a variety of communication line connections, such as those described previously.  
9 When used in a WAN networking environment such that computer 14 may communicate  
10 with communication system 18, computer 14 may include a modem 182, a wireless link, or  
11 other means for establishing communications over the wide area network 178, such as the  
12 Internet. The modem 182, which may be internal or external, is connected to computer bus  
13 124 via serial port interface 164. In a networked environment, program modules depicted  
14 relative to computer 14, or portions thereof, may be stored in the remote memory storage  
15 device. It will be appreciated that the network connections shown are exemplary and other  
16 means for establishing communications over wide area network 178 may be used.

17 Various transmission or communication protocols may be used to enable computer  
18 14 to receive and transmit data through network 16. In one embodiment of the present  
19 invention, computer 14, and more specifically, network interface 180 or serial port  
20 interface 164, may use TCP/IP communication protocol. Alternatively, computer 14 may  
21 use connection orientated or connectionless networks via asynchronous transfer mode  
22 (ATM) technology, X.25 protocol, Frame Relay protocol, packet switching protocols,  
23 circuit switching protocols, dynamic packet switching protocols, 802.11RF protocol, home

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1 network protocols, CSAFE 1, CAN protocols, and the like to transmit and receive data  
2 through network 16.

3 The term "transceiving" as used herein will mean transmitting, receiving, or a  
4 combination of both transmitting and receiving data. The term "packetized",  
5 "packetizing", and the like, as used herein will mean data that has been manipulated into  
6 one or more packets according to a packet switching protocol for transmission via network  
7 16, such as may be understood in light of the following teaching and knowledge within the  
8 art.

9 Generally, the packet contains the destination address in addition to the data. Each  
10 packet may be transmitted individually or may be combined or pooled with other packets  
11 of data going to similar destinations, such as audio data, video data and/or control signals.  
12 The packets of data or pooled data are optionally compressed and encapsulated for  
13 transceiving across network 16, where each packet may follow different routes to its  
14 destination. Once all the packets of a specific data message arrive at the destination, they  
15 are decompiled and deencapsulated into the original data. The packets may be prioritized  
16 according to content so that certain packets of data are delivered to computer 14, and hence  
17 treadmill 12, through network 16 faster than the other packets of data. For example, in a  
18 live-on-live exercise program situation audio and video data or signals are transceived  
19 faster than the control signals. Therefore, according to one embodiment, an individual may  
20 communicate with a trainer in real time without the need to interrupt the real-time  
21 communication between the trainer and the user so that one or more control signals may be  
22 delivered to the exercise device. An advantage of packetizing data, therefore, is that  
23 computer 14, translator device 13, and/or treadmill 12 may optimize its performance  
24

1 according to the available bandwidth of the communication connection line with network  
2 16 without the need to interrupt the real-time communication between a user and a trainer.

3 The discussion above describes a computer detached from treadmill 12; however,  
4 as appreciated and stated earlier, all or portions of computer 14 may be optionally  
5 incorporated within treadmill 12. As such, some or all of the various elements of computer  
6 14 may be incorporated within control panel 22, or alternatively within tread base 26. In  
7 various other configurations of the present invention, therefore, control panel 22 may  
8 include one or more magnetic hard disk drives, magnetic disk drives, optical disk drives,  
9 and associated interfaces. Control 22, therefore, may be capable of accessing programming  
10 that is stored on computer diskettes, CD ROMs, DVDs, and the like. Additionally, control  
11 panel 22 may optionally include a keypad integrally formed therein, or optionally include a  
12 standard keyboard interface that may enable a user to communicate with treadmill 12. The  
13 keypads and keyboard enable the user to control the operation of treadmill 12, and  
14 optionally communicate with communication system 18 and other hardware and/or  
15 software modules that may be accessible via network 16.

16 As depicted in Figure 1, computer 14 may optionally communicate with translator  
17 device 13 that is configured to manipulate signals transmitted and received between  
18 computer 14 and treadmill 12. Specifically, translator device 13 may be used when  
19 computer 14 and treadmill 12 are incapable of directly communicating one with another.  
20 Translator device 13 includes one or more processors that convert the signals passed  
21 therethrough to a form that the device to receive such signals might understand. For  
22 example, computer 14 may communicate with translator device 13 via a serial connection,  
23 while treadmill 12 may only communicate with devices that deliver data via a serial I<sup>2</sup>C  
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1 connection or protocol. As such, translator device 13 is configured to manipulate the serial  
2 signal received from computer 14 into a signal capable of being delivered via a serial I<sup>2</sup>C  
3 connection or bus.

4 It may be appreciated by one skilled in the art that translator device 13 may convert  
5 various types of signal to various other forms capable of being transmitted to various  
6 interfaces. For example, translator device 13 may use a SPI bus, a microwire bus, a  
7 microbus, a CAN protocol, a CSAFE 1 protocol, a home network protocol, TCP/IP  
8 communication protocol, an asynchronous transfer mode (ATM) technology, X.25  
9 protocol, Frame Relay protocol, packet switching protocols, circuit switching protocols,  
10 dynamic packet switching protocols, 802.11RF protocol, serial, parallel, USB, or wireless  
11 connection, and the like. Additionally, the structure and function of translator device 13  
12 may be completely or partially incorporated within treadmill 12, computer 14, or a  
13 combination thereof.

14 Generally, computer 14 and/or translator device 13, collectively and/or individually  
15 are examples of a communicating mechanism, communicating with the interface means  
16 (e.g., the input devices of console 22 that gather a signal from the user). In one  
17 embodiment, the communicating mechanism enables real-time transmission of a first  
18 signal to: a live trainer (e.g., on treadmill 20), a stored trainer (e.g., communication system  
19 18), another user, or a third party 21, for example. The communicating mechanism may  
20 also receive a packetized second real-time signal from any of these sources.

21 The second real-time signal may be an audio or visual signal directed to the user  
22 and/or a control signal directed to a device, such as an exercise device 12, for example.  
23 The audio and/or visual signal and the control signal may come from the same source, such  
24

1 as a trainer 20. In one embodiment, however, the second real time signal comprises an  
2 audio and/or visual signal from one source and a control signal from another source. For  
3 example, the audio and/or signal may come from a live trainer, while the control signal  
4 may come from a website or vice versa. Optionally, the audio, visual, and control signals  
5 are each directed both to the user and to the exercise device, such as when the control  
6 signal is an audible signal directed to a microphone connected to the device.

7       Computers 14 and/or translator device 13 portions are collectively or individually  
8 examples of a communicating mechanism. Additionally, when portions of one more  
9 computers 14 and/or translator devices 13 are incorporated within treadmill 12, such  
10 portions are collectively or individually examples of a communicating mechanism.  
11 Examples of such a communicating mechanism of the present invention may comprise (i) a  
12 single structure that enables transmission of the first signal and/or receives the packetized  
13 second signal or (ii) a first structure that enables transmission of the first signal and a  
14 separate second structure that receives the packetized second signal. Any of these  
15 communicating mechanisms are examples of structures capable of performing the function  
16 of communicating means, communicating with the interface means, for receiving a  
17 packetized second signal (such as a real time signal), and optionally, for enabling  
18 transmission of the first signal (such as a real time signal).

19       In one embodiment, the communicating means only receives the second signal.  
20 For example, upon merely activating a user input device, such as by turning the power of  
21 the exercise device or other device on, a first signal is “gathered from the user,” but is not  
22 transmitted. Instead, the first signal merely activates the power and enables the  
23 communicating mechanism to receive any second packetized signal that may be broadcast  
24

1 to the exercise device. Such a broadcast may be from a communication system 18, such as  
2 by wireless transmission, RF transmission, or other means known to those skilled in the  
3 art. In another embodiment, the communicating mechanism transmits the first signal and  
4 receives the second signal.

5 Additionally, computer 14 and/or translator device 13, collectively and/or  
6 individually are examples of structures capable of performing the function of control  
7 means, communicating with the exercise mechanism, for receiving one or more packetized  
8 control signals from the communication system indicative of the selected exercise program  
9 and for changing one or more operating parameters of the exercise mechanism based upon  
10 the selected exercise program and the one or more packetized control signals.

11 As discussed above with respect to Figure 1, computer 14 may transceive one or  
12 more signals to and from communication system 18 through network 16. Referring now to  
13 Figure 8, a schematic block diagram of communication system 18 is illustrated. For  
14 simplicity, only the most relevant hardware components are illustrated in Figure 8. It may  
15 be appreciated by one skilled in the art that various other components may be included  
16 within communication system 18 depending on the particular use and function of  
17 communication system 18.

18 As depicted, communication system 18 includes an interface 190 that  
19 communicates with a control processor 192 and an interface 198. Interface 190 is  
20 configured to transceive one or more signals to and from computer 14 and treadmill 12 via  
21 network 16. Such signals may include audio and visual signals of the user exercising, the  
22 status of the exercise device, such as active status, deactivated status, standby status, data  
23 and information about the user, such as heart rate, blood pressure, and the like that has  
24

1 been gathered by one or more health monitoring devices. Such devices may include but  
2 are not limited to electrodes, transducer, other ECG monitoring devices, a pulse watch, a  
3 heart rate monitor, an EKG electronic detection device, an ECG electronic detection  
4 device, and the like. Similarly, interface 198 enables communication system 18 to transmit  
5 the above signals to and receive various signals from a trainer at treadmill 20 via network  
6 16 (Figure 1). Such received signals may include audio, visual, and/or control signals.  
7 Alternatively, the trainer at treadmill 20 may receive no signals, in the case where  
8 communication system 18 controls treadmill 12 without a trainer at treadmill 20.

9       Each interface 190, 198 therefore, may be of a variety of types depending on the  
10 particular communication line connection used in system 10 and the particular  
11 transmission protocols used by computer 14, treadmill 12, translator device 13, or treadmill  
12 20. For example, interfaces 190, 198 may be a wireless interface, may use infrared (IR),  
13 radio frequency (RF), microwave technology, satellite, blue tooth transmission, home  
14 network protocols, or various other protocols and technology as known by one skilled in  
15 the art. Alternatively, interfaces 190, 198 may be a modem, cable modem, ADSL  
16 connection, ISDN, Ethernet, or similar other connections. Interfaces 190, 198 either solely  
17 or in combination with the other elements of communication system 18, may use various  
18 transmission protocols to transceive data between treadmill 12 and treadmill 20 via  
19 communication system 18. It may be appreciated by one skilled in the art that interfaces  
20 190, 198 need not be the same, so long as they may communicate with control processor  
21 192, and the other appropriate elements of system 10.

22       Communicating with interface 190 and interface 198 is a control processor 192.  
23 Control processor 192 is configured to transceive signals through interface 190 and  
24

1 manipulates the same based on selected programming selected by: (i) the user; (ii) a trainer  
2 located at treadmill 20; (iii) a third party; or (iv) a combination thereof. Subsequently,  
3 control processor 192, optionally in combination within interface 190 or 198, prepares the  
4 selected programming (i.e., audio and video signals with associated control signals, if any)  
5 for transmission to treadmill 12 and 20. Control processor 192 also preferably "packetizes"  
6 the programming so that packets of information may be "streamed" or downloaded  
7 through respective interfaces 190, 198 to computer 14, and subsequently treadmill 12, or to  
8 treadmill 20. Each packet of data may sent individually, and may follow a different path  
9 across network 16 to reach computer 14 (or treadmill 12). Upon reaching computer 14 (or  
10 treadmill 12 or 20), the data may be "buffered" so that the data may be delivered to the  
11 user or trainer in real-time.

12 Generally, control processor 192 may include one or more micro-controllers,  
13 central processing units, state machines, programmable logic arrays, network logical  
14 arrays, or gates, ASIC processors, software-based controllers, combination logic,  
15 combinations thereof, and a variety of other controllers known by one skilled in the art to  
16 manipulate data transceived between treadmill 12, communication system 18, and/or  
17 treadmill 20.

18 Control processor is one example of a structure capable of performing the function  
19 of means for synchronizing and packetizing the controls signals with the programming and  
20 delivering the packetized control signal to the user device. It may be appreciated that  
21 various other control processors and means are appropriate and known to those skilled in  
22 the art.

17 Also communicating with control processor 192 is control signal generator 200.  
18 Control signal generator 200 includes circuitry and/or software to generate the control  
19 signals that are synchronized with the audio and video programming retrieved from  
20 memory 194 and/or external memory 196 or alternatively transmitted from treadmill 20  
21 through interface 198. Therefore, control signal generator 200 may include one or more  
22 micro-controllers, central processing units, state machines, programmable logic arrays,  
23 network logical arrays, or gates, ASIC processors, software-based controllers, combination

1 logic, combinations thereof, and a variety of other controllers known by one skilled in the  
2 art to generate one or more control signals.

3 Control signal generator 200 is one structure capable of performing the function of  
4 means for generating one or more control signals. One skilled in the art may identify  
5 various other configurations of means for generating one or more control signals.

6 Various configurations are applicable for encoding a control signal on a carrier  
7 signal included with the audio and video programming. Following hereinafter is a  
8 discussion of one format for encoding the control signals will now be discussed. It should  
9 be understood that the method of encoding set forth herein is representative only and is not  
10 intended to limit the scope of this invention or to limit the various other alternative means  
11 or methods by which a control signal may be transmitted to treadmill 12 and/or optionally  
12 treadmill 20. Additionally, any number of encoding schemes, which are known to those  
13 skilled in the art, may be used to carry out the desired function and are encompassed  
14 within, the scope of the present invention.

15 In one embodiment, the control signals generated by control signal generator 200  
16 are carried on a two (2) kHz carrier signal, with each control signal consisting of two  
17 transmission bursts, each burst having three bytes of data. The second burst is intended to  
18 exactly duplicate the first burst for error checking purposes. The first byte of data of each  
19 burst, generated by control signal generator 200, in this illustrative embodiment, indicates  
20 the desired speed of the treadmill, while the second byte of data indicates the desired  
21 incline of the tread base 26, and the third byte is a check sum of the first and second bytes.  
22 For other exercise devices the first and second bytes may represent other operating  
23 parameters, like resistance of an elliptical device or cycle device. It may be appreciated  
24

1 that each burst may include less or more than 3 bytes of data, depending on the different  
2 type of device that communicates with communication system 18. As configured, the  
3 control signal uses a standard RS-232 protocol. Alternatively, control signals may also use  
4 other serial or parallel protocols, such as RS-422, RS-423, universal serial bus (USB) and  
5 various other communication protocols known by one skilled in the art in light of the  
6 teaching contained herein.

7 In one embodiment, each control signal includes both the first burst and the second  
8 burst. Generally, the control signal is typically left in one quarter second in duration. Each  
9 byte consists of eight bits of data, giving a high degree of resolution for controlling the  
10 exercise device operating parameters, such as treadmill speed and the degree of incline. In  
11 one embodiment, each time a control signal is inserted into the programming, the control  
12 signal entirely suppresses the audio portion of the programming for the duration of the  
13 control signal. Alternatively, and more preferably, the control signal does not entirely  
14 suppress the audio portion of the programming. Rather the control signal is overlays the  
15 programming so that the programming is uninterrupted. As a result, the control signals are  
16 audible to the user which also provides an audible cue or warning to the user that one or  
17 more operating parameters of treadmill 12 is about to change. Alternatively, the control  
18 signals are inaudible to the user, but may be analyzed by computer 14 and/or treadmill 12.  
19 The inaudible signals may, therefore, dictate an additional or alternate manners by which  
20 the user is signaled of an impending change in one or more operating parameters of  
21 treadmill 12. For example, in addition to an audio signal, the control signal may include a  
22 video signal, such as a flashing red border that may appear around the exterior perimeter of  
23 the video output device 94 and overlap the video display to inform the user of a change in  
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1 operating parameters of treadmill 12. It may be appreciated by one skilled in the art that a  
2 combination of both audio and video indicators, whether or not the programming is  
3 modified, such as the audio being eliminated, or the video being eliminated, may be used  
4 to inform the user of an impending change in operating parameters.

5 As alluded to above, the control signals are detectable by computer 14 or treadmill  
6 12, that verifies the control signal has the proper 2 kHz carrier frequency, checks to make  
7 sure that the control signals otherwise properly formatted, and check for errors. If the  
8 signal is approved, the signal is delivered to the appropriate controllers for varying the  
9 operating parameters of treadmill 12.

10 Generally, the operation of communication system 18 varies depending on the  
11 particular manner by which the programming is to be delivered to user on treadmill 12. In  
12 one configuration, treadmill 20 is similarly configured to treadmill 12, previously  
13 described. In such a case, when an individual wishes to perform an exercise program in  
14 real-time with a distantly located trainer training on treadmill 20, the trainer, preceding the  
15 scheduled exercise time, accesses or "logs on" to communication system 18. Upon  
16 logging onto communication system 18, the trainer prepares the desired exercise program  
17 or alternatively selects a stored control signal profile that is synchronized to the desired  
18 program from memory 194 and/or external memory 196. At the scheduled time for a live-  
19 on-live treadmill exercise program, both the user of treadmill 12 and the trainer located at  
20 treadmill 20 accesses communication system 18. The trainer activates the control signal  
21 profile, which is delivered to control processor 192. Control processor 192 delivers to both  
22 treadmill 12 and treadmill 20 both the audio and/or video programming and the desired  
23 control signals to vary the operating parameters of each treadmill 12, 20 in synchronization  
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1 with the audio and/or video programming. Control processor 192, optionally in  
2 combination with interfaces 190, 198 prepares, the control signals with the audio and video  
3 signals in accordance with the communication protocol that computer 14, translator device  
4 13, treadmill 12 and/or treadmill 20 uses. Alternatively, control processor 192 may deliver  
5 control signals to treadmill 12 to vary the operating parameters thereof, while sending an  
6 audio and/or video representation of the exercise profile (i.e., speed, distance, time,  
7 inclination of the exercise device) of the exercise program delivered to the user, so that the  
8 trainer may then manually vary the operating parameters of treadmill 20 as desired. The  
9 delivery of the programming including the control signal may be termed a packetized  
10 second signal (preferably a packetized second real time signal).

11 In one embodiment, changes made by the trainer on treadmill 20 are translated into  
12 control signals that are delivered to treadmill 12 to vary the operating parameters therein.  
13 As such, treadmill 20 includes one or more sensors that identify changes made to the  
14 operating parameters of treadmill 20 and deliver signals representative of such changes to  
15 control processor 192. Upon receiving the sensed information, control processor 192  
16 delivers a request to control signal generator 200. Control signals generator 200  
17 subsequently generates a control signal associated with the actions taken by the trainer on  
18 treadmill 20 and passes those signals through control processor 192, interface 190, and  
19 optionally computer 14 to treadmill 12. The delivery of the programming including the  
20 control signal may be termed a packetized second signal or a packetized second real time  
21 signal.

22 In still yet another configuration, treadmill 20 is configured to include control  
23 signal generator 200. In this particular configuration, as a trainer performs a programming  
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1      workout, whether such programming is stored on treadmill 20 or alternatively accessed  
2      through communication system 18, control signal generator 200 creates the bursts of bytes  
3      in accordance with changes made by trainer made on treadmill 20. As such, the control  
4      signals are sent from treadmill 20 through interface 198 to control processor 192. Control  
5      processor 192 then passes the control signals along with the audio and video programming,  
6      through interface 190 to treadmill 12. The delivery of the programming including the  
7      control signal may be termed a packetized second signal (preferably real time).

8              It may be appreciated by one skilled in the art, that the various above-described  
9      configurations are only illustrative of the manner by which treadmill 20 may control the  
10     operation of treadmill 12 either directly or alternatively indirectly through the use of  
11     control signal generator 200 and the other components and modules of communication  
12     system 18.

13              Following hereinafter, and depicted in Figure 9, is a function of block diagram of  
14     one embodiment of treadmill 12. In this particular configuration, the functionality of  
15     personal computer 14 is not incorporated within treadmill 12; however, as may be  
16     appreciated by one skilled in the art, computer 14 may be incorporated within control panel  
17     22 or other portions of treadmill 12. This embodiment enables true interactive  
18     communication between a user operating treadmill 12 in his /her own home, and a personal  
19     trainer located at a remote location, such as where treadmill 20 is located. Additionally,  
20     the trainer may observe the user in real-time and control the user's treadmill 12 remotely  
21     and in real-time via communication system 18 without interrupting the real-time audio and  
22     video programming.

1 As shown, treadmill 12 includes control panel 22 and treadmill controller 56.  
2 Although shown separated, it may be appreciated that portions of each may be combined  
3 together, thereby simplifying the modules and components of the present invention.  
4 Control panel 22, in this embodiment, incorporates audio input device 90 in the form of a  
5 microphone and a video input device 92 in the form of a video camera for gathering audio  
6 and video signals to be transmitted to communication system 18. As mentioned  
7 previously, the audio and video receivers need not be incorporated within control panel 22  
8 or other portion of treadmill 12. Rather, audio input device 90 and video input device 92  
9 may be located distant from treadmill 12, while having sufficient detection controls to  
10 receive the requisite audio and video signals.

11 Signals from audio input device 90 and video input device 92 are delivered to an  
12 audio/video controller 212. Audio/video controller 212 is configured to manipulate the  
13 audio and video signals received from input devices 90, 92 in preparation for transmission  
14 to a processor 214. Audio/video controller 212, therefore, includes one or more amplifiers,  
15 micro-controllers, central processing units, state machines, programmable logic arrays,  
16 network local logical arrays, or gates, ASIC processors, software based controllers,  
17 combination logic, or combinations thereof to both manipulate audio and video signals that  
18 are to be transmitted or received by input devices 90, 92 and associated output devices 94,  
19 96. Additionally, audio/video controller 212 may include memory, such as a buffer, to  
20 store and aid with real-time transmission and delivery of the audio and video signals. It  
21 may be appreciated by one skilled in the art that various audio/video controllers 212 are  
22 applicable and known in the art in light of the teaching contained herein.

1 Communicating with audio/video controller 212 is processor 214. Processor 214  
2 converts the audio and video data received through audio/video controller 212 into the  
3 desired form that is capable of being transmitted to communication system 18 via  
4 communication interface 210. As such, processor 214 may perform various operations on  
5 the data to be delivered to communication system 18, such as but not limited to, packing,  
6 encrypting, splitting, and the like. Additionally, processor 214 may be configured to  
7 perform various operations to data received from communication system 18, such as but  
8 not limited to the reverse of the above operations. Generally, processor 214 may have  
9 various configurations to perform the above-described function as known by one skilled in  
10 the art. For example, processor 214 may take the form of one or more micro-controllers,  
11 central processing unit (CPU), state machines, programmable logic arrays, or network of  
12 logical gates, ASIC processor, software-based controllers, a combination of these  
13 components, or a variety of other controllers.

14 According to another aspect of the present invention, processor 214 may receive  
15 various inputs from one or more manually operated input devices 216, such as manual  
16 override button 84, scaling controls 84, and other controls and buttons known to one  
17 skilled in the art in light of the teaching contained herein. In response to such inputs,  
18 processor 214 may vary the operating parameters of treadmill 12 and provide the user with  
19 notification of such change in the operating parameters of treadmill 12 via output devices  
20 218 and/or video output device 94 and audio output device 96. Processor 214, therefore, is  
21 one structure capable of performing the function of means for controlling the operating  
22 parameters of the exercise mechanism in real-time and one structure capable of performing  
23 the function of control means for receiving one or more packetized control signals from a

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1 communication system indicative of a selected exercise program and changing one or more  
2 operating parameters of the exercise mechanism based upon the selected exercise program  
3 and the one or more packetized control signals.

4 Communicating with processor 214, in one embodiment, is communication  
5 interface 210 that enables treadmill 12 to transceive data, such as packetized data, via a  
6 communication line. Communication interface 210, in one embodiment, is a modem.  
7 Depending on the particular communication manner used to communicate with  
8 communication system 18, different communication interfaces 210 may be used at  
9 different communication line connections. For example, the communication line  
10 connection may include existing broadcast technology, including television broadcast over  
11 the airwaves, cable or cable modems, satellite, telephone lines, whether analog or digitally  
12 based, the internet, DSL, G-Lite, wireless technology, other high-speed data connections,  
13 or any other suitable transmission technology or medium. As such, communication  
14 interface 210 is compatible with existing conventional broadcast technologies and can  
15 interface with existing audio and/or video components commonly found in homes, thereby  
16 reducing the overall cost of the exercise device and reducing barriers to accessing  
17 communication system 18.

18 Communicating with processor 214 and optionally communicating with  
19 communication interface 210 is treadmill controller 56. As illustrated in Figure 9,  
20 treadmill controller 56 communicates with control panel 22. Generally, treadmill  
21 controller 56 may communicate with control panel 22 by an I<sup>2</sup>C bus, a SPI bus, a  
22 microwire bus, a microbus, and the like.

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1       In one embodiment, treadmill controller 56 includes a treadmill processor 220,  
2 memory 222, and a control signal decoder 224. Treadmill processor 220 is configured to  
3 control the operation of speed motor 226 and incline motor 228 that controls the speed and  
4 incline of treadmill 12. Treadmill processor 220, therefore, is one structure capable of  
5 performing the function of means for controlling the operating parameters of the exercise  
6 mechanism in real-time and one structure capable of performing the function of control  
7 means for receiving one or more packetized control signals from a communication system  
8 indicative of a selected exercise program and changing one or more operating parameters  
9 of the exercise mechanism based upon the selected exercise program and the one or more  
10 packetized control signals.

11       Treadmill processor 220 is optionally controlled by processor 214 or by control  
12 signal decoder 224 in response to the various signals received through communication  
13 interface 210 from communication system 18. Alternatively, treadmill processor 220 may  
14 be controlled by signals obtained from memory 222, via input devices 216, audio input  
15 device 90 and video input device 92. Treadmill processor 220 may include various  
16 components and modules to perform the desired function. For example, treadmill  
17 processor 220 may include one or more micro-controllers, central processing unit (CPU),  
18 state machines, programmable logic arrays, or network of logical gates, ASIC processor,  
19 software-based controllers, combination logic, a combination of these components, or a  
20 variety of other controllers.

21       Controller 212, processor 214, interface 210, and treadmill processor 220 are  
22 collectively and individually examples of structures capable of performing the function of

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1 communicating means, communicating with the interface means, for receiving a  
2 packetized second signal, and optionally, for enabling transmission of the first signal.

3 Both processor 214 and treadmill processor 220 are capable of receiving and  
4 transmitting feedback signals from the various elements of treadmill 12, for example, feed  
5 back from drive motor 226 and incline motor 228. Each processor 214, 220 is capable of  
6 converting the feedback signals into signals for the video output device 94 or monitor 166  
7 communicating with computer 14. The particular feedback signals received from speed  
8 motor 226 and incline motor 228 may be stored in registers or memory modules.

9 Treadmill 12, as depicted, optionally includes one or more sensors, such as belt  
10 speed sensor 230 and incline sensor 232. Each sensor 230, 232 gathers a particular  
11 operating parameter of treadmill 12 (speed of belt 42 (Figure 4) and incline of tread base  
12 26), such that control panel 22 may present outputs via the output devices that are  
13 indicative of the present operating state of treadmill 12 at any given point in time.  
14 Treadmill 12 may include other sensors that gather various other operating parameters,  
15 such as but not limited to, maximum pulse and heart rate, average pulse and heart rate,  
16 target heart rate, length of workout session, and the like. Additionally, sensors 230, 232,  
17 optionally in combination with one or more other sensors, may determine whether an  
18 individual is actually exercising on treadmill 12 and deliver a feedback signal to processor  
19 214 that informs communication system 18 and/or the trainer. Furthermore, sensors 230,  
20 232, optionally in combination with one or more other sensors, may calculate whether the  
21 individual is a juvenile and stop treadmill 12 in the event that the user is a juvenile.

22 As discussed earlier, system 10 enables a user of treadmill 20 to communicate with  
23 and control one or more operating characteristics or parameters of treadmill 12. There are  
24

1 various manners by which treadmill 12 may be controlled by communication system 18  
2 solely or in combination with treadmill 20 or a third party. Following hereinafter is a  
3 continued discussion of the operation of the illustrated embodiment of treadmill 12  
4 depicted in Figure 9.

5 During operation of treadmill 12 a user initially inserts a dead-man key (not shown)  
6 within port 98 of control panel 22 (Figure 6). Upon insertion of the dead-man key,  
7 treadmill 12 is capable of being operated, i.e., power is allowed to flow to the various  
8 internal and external components of treadmill 12 and treadmill 12 has an active status.  
9 Once activated, a user may optionally connect to communication system 18 or use a stored  
10 or manually defined exercise program or workout. In the event that the user wishes to  
11 connect to communication system 18, in one embodiment, a user activates iFit.com button  
12 82 (Figure 6), thereby initiating the hardware and/or software modules within either  
13 treadmill 12 or computer 14 to create a connection with communication system 18.  
14 Alternatively, upon placing treadmill 12 in active status, treadmill may automatically  
15 connect to communication system 18.

16 Once a link is achieved and a user optionally has provided password and user  
17 identification, a user may select either stored or live-on-live exercise programs. Following  
18 the user selection, programming, whether live or stored is delivered (optionally in real  
19 time) to communication interface 210 via one or more of a variety of communication line  
20 connections, whether such connections are digital, analog, serial, parallel, or a combination  
21 thereof. The particular configuration of communication interface 210 may vary based  
22 upon the particular communication line connection used.

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1 It may be appreciated by one skilled in the art that the exercise program may be  
2 displayed to the user in a variety of manners, depending on the particular signals received  
3 from communication system 18 or trainer device 20. For example, the programming may  
4 include an exercise profile that periodically or continually appears on video output device  
5 94. Alternatively, the programming may solely include the above-described exercise  
6 profile, thereby enabling the user of treadmill 12 to view educational or entertainment  
7 programming via video output device 94 during their exercise program.

8 Upon receiving the programming, communication interface 210 may optionally  
9 deliver the audio signal to control signal decoder 224 that identifies the control signal. In  
10 another setting, communication interface 210 may deliver both the audio and video signals,  
11 with the control signal, to processor 214 for manipulation and distribution to the  
12 appropriate hardware components, and/or software modules. Such delivery of  
13 programming may be performed through use of a general-purpose bus or a variety of other  
14 buses and protocols, such as an I<sup>2</sup>C bus, SPI bus, Microwire bus, Microbus, CAN protocol,  
15 home network protocol, or the like. Additionally, the control signals, and the audio and the  
16 video signals may be delivered using the CSAFE 1 protocol or equivalent thereof for  
17 various other types of device not within the field of exercise devices.

18 When communication interface 210 delivers all signals to processor 210, processor  
19 214 separates the audio, video, and control signals and optionally delivers them to  
20 audio/video controller 212, control signal decoder 224, treadmill processor 220, or  
21 memory 224. For example, in one configuration processor 214 may optionally deliver  
22 portions of the audio and video signals control signal decoder 224, either directly or  
23 through treadmill processor 220 such that the audio and video signals are "buffered" in  
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1 accordance with "streaming" technology. If the available bandwidth does not allow real-  
2 time streaming of audio and video signals, video frames and the audio signals may be  
3 separated and transceived so that a segmented display is provided with real-time audio  
4 signals. Although segmenting of video frames is not preferred it is one possible  
5 alternative method of streaming audio and video signals. In another configuration, upon  
6 receiving the signals from processor 214, control signal decoder 224 may optionally store  
7 the complete audio and video signals for an entire program before treadmill 12 may access  
8 such signals. In yet another configuration, processor 214 may optionally deliver only the  
9 audio signal and the control signal to treadmill processor 220 that may include the  
10 functionality of control signal decoder 224 therein. The particular manner by which  
11 treadmill processor 220 retrieves either the encoded control signal or the decoded control  
12 signal may vary from configuration to configuration depending on the particular form of  
13 treadmill 12.

14 Generally, control signal decoder 224 either individually or collectively with  
15 processor 214 and/or treadmill processor 220 is one structure capable of performing the  
16 function of means for decoding the control signal having an input and an output. One  
17 skilled in the art may identify various other configurations of a means for decoding the  
18 control signal having and input and an output. For example, treadmill processor 220  
19 and/or processor 214 may include a control signal decoder and hence be a means for  
20 decoding the control signal having an input and an output.

21 Following manipulation of the control signals to obtain the control instructions,  
22 treadmill processor 220 performs the control process on the various components of  
23 treadmill 12 as dictated by the control instructions. For example, treadmill processor 220  
24

1 may cause motor 46 to speed up thereby accelerating belt 42 or alternatively cause motor  
2 60 to rotate thereby raising or lowering tread base 26. Motors 46, 60 and 226, 228 are  
3 structures capable of performing the function of means, electrically coupled to the output  
4 of the decoding means for driving the moveable element in response to the decoded control  
5 signal. It may be appreciated by one skilled in the art that the control instructions may  
6 cause various other changes to the operating parameters of treadmill 12, and other devices.  
7 Similarly, various means for driving the moveable element in response to the decoded  
8 control signal. For example, the means may vary depending on the particular type of  
9 exercise device used.

10 While treadmill processor 220 is either decoding the control signal from the audio  
11 signal received from communication system 18 or merely activating speed motor 226  
12 and/or incline motor 228, processor 214 delivers the audio and video signals received  
13 through communication interface 210 to audio/video controller 212. Audio/video  
14 controller 212 manipulates the signals received and passes the audio signal to audio output  
15 device 96 and the video signal to video output device 94. Optionally, processor 214 may  
16 send portions of the audio or video signals to the output devices 218 to provide the user  
17 with multiple sources of representations of the current operating parameters of treadmill  
18 12, or exercise device.

19 In another alternative configuration of the present invention, the audio, video, and  
20 control signals received by communication interface 210 are delivered to processor 214 for  
21 manipulation and delivery to audio/video controller 212. In such a case, the video data is  
22 displayed on video output device 94 while the audio signal including the control signal is  
23 transmitted to audio output device 96. In this configuration, audio input device 90 or a  
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1 second audio input device (not shown) is configured to receive various control signals that  
2 are delivered by audio output device 96 and pass those back to processor 214. The control  
3 signals are subsequently decoded and treadmill processor 220 may activate speed motor  
4 226 and/or incline motor 228 in accordance with the delivered control signals.

5 Generally, communication interface 210, processor 214, audio/video controller  
6 212, treadmill processor 220, and/or control signal decoder 224 are collectively and  
7 individually examples of a controller, responsive to the packetized second signal,  
8 configured to control the operating parameters of the exercise mechanism (preferably in  
9 real time). Additionally, such controller is a structure capable of performing the function  
10 of control means, communicating with the exercise mechanism, for receiving one or more  
11 packetized control signals from the communication system indicative of the selected  
12 exercise program and for changing one or more operating parameters of the exercise  
13 mechanism based upon the selected exercise program and the one or more packetized  
14 control signals. It may be appreciated by one skilled in the art that the control means may  
15 have various other configurations.

16 Following hereinafter is a generalized discussion of a number of features of an  
17 exercise system, exercise devices, methods, computer products, and computer readable  
18 media associated with the teaching and disclosure of the present invention. Referring now  
19 to Figures 10-19, a system 250 is illustrated. The majority of the features described with  
20 respect to system 10, also apply to system 250.

21 Generally, this embodiment of the present invention may comprise one or more  
22 hardware components, such as those described above and illustrated in Figure 1, 7, and 10,  
23 and various special-purpose or general-purpose computers. Embodiments within the scope  
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1 of the present invention also include computer-readable media for carrying or having  
2 computer-executable instructions or data structures stored thereon. Such computer-  
3 readable media can be any available media that can be accessed by a general-purpose or  
4 special-purpose computer and the hardware and/or software modules associated with  
5 system 10 (Figure 1). By way of example, and not limitation, such computer-readable  
6 media can comprise RAM, ROM, EEPROM, CD-ROM, or other optical disk storage,  
7 magnetic disk storage, or other magnetic storage devices, or any other medium which may  
8 be used to carry or store desired program code means in the form of computer-executable  
9 instructions or data structures and which may be accessed by a general-purpose or special-  
10 purpose computer. When information, such as one or more signals or programming is  
11 transferred or provided over network 16 or another communications connection (either  
12 hardwired, wireless, or a combination of hardwired or wireless) to treadmill 12, translator  
13 device 13, computer 14, communication system 18, and /or treadmill 20, such devices  
14 properly view the connection as a computer-readable medium. Thus, any such a  
15 connection is properly termed a computer-readable medium. Combinations of the above  
16 should also be included within the scope of computer-readable media. Computer-  
17 executable instructions may include, for example, instructions and data which cause a  
18 general-purpose computer, special-purpose computer, or special-purpose processing device  
19 to perform a certain function or group of functions.

20 Although not required, the present invention will be described in the general  
21 context of computer-executable instructions, such as program modules, that may be  
22 executed by one or more computers in various network environments, such as within the  
23 environments illustrated in Figures 1, 7, and 10. Generally, program modules include  
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1 routines, programs, objects, components, data structures, etc. that perform particular tasks  
2 or implement particular abstract data types. Computer-executable instructions, associated  
3 data structures, and program modules represent examples of program code means for  
4 executing steps of the methods disclosed herein. The particular sequence of such  
5 executable instructions or associated data structures represents examples of corresponding  
6 acts for implementing the functions described in such steps.

7 According to this illustrative embodiment of the present invention, a distantly  
8 located personal trainer performing an exercise on one treadmill in real-time may control  
9 one or more operating parameters of an exercise device used by a user performing an  
10 exercise program. However, it may be appreciated that the systems, methods, and devices  
11 of the present invention may be implemented and utilized in various other situations and  
12 with various other exercise devices or other devices unrelated to exercise devices. The  
13 systems and methods of the present invention may be implemented using a variety of  
14 hardware and/or software modules and include a variety of computer network  
15 configurations, including but not limited to multiple computers and/or exercise devices that  
16 are connected via the Internet, LANs, WANs, and the like.

17 To more easily explain the function and structures of system 250, reference will  
18 now be made to Figure 10 that is a block diagram illustrating one embodiment of the  
19 present invention. As shown, system 250, that is similar to system 10, includes a number  
20 of user modules 252a-252n that represent, in this embodiment, multiple exercise devices,  
21 translator devices 13, and/or computers 14, whether such exercise devices, translator  
22 devices 13, and/or computers 14 are located in the same area, or distantly located one with  
23 another, such as at a number of user's homes. Alternatively, as discussed earlier, user  
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1 modules 252a-252n may take the form of various other devices known by one skilled in  
2 the art. For example, the exercise devices may include treadmill 12, ellipticals, cycles,  
3 steppers, hikers, climbers, Nordic type exercise devices, and other various types of exercise  
4 devices as known by one skilled in art.

5 Generally, user modules 252a-252n include one or more exercise mechanisms with  
6 one or more moveable elements that enable a user to exercise during an exercise program,  
7 whether such exercise program requires anaerobic exercise, aerobic exercise, or a  
8 combination thereof. Therefore, the modules of each user module 252a-252n may be  
9 structures capable of performing the functions of: (1) control means for receiving one or  
10 more packetized controls signals from the communication system (communication  
11 module) indicative of a selected exercise program and changing one or more operating  
12 parameters of the exercise mechanism based upon the selected exercise program and the  
13 packetized controls signals; (2) interface means, communicating with the exercise  
14 mechanism, for gathering a first real-time signal from the user; (3) communicating means,  
15 communicating with the interface means, for receiving a packetized second signal, and  
16 optionally, for enabling transmission of the first signal; (4) means for reproducing the  
17 second signal; (5) means for controlling the operating parameters of the exercise  
18 mechanism; (6) means for decoding the control signals; and (7) means for driving the  
19 moveable element in response to the decoded control signals.

20 In one embodiment, user modules 252a-252n communicate with a communication  
21 module 254, via network 16. In one embodiment, communication module 254 has a  
22 similar configuration to that of communication system 18 and is capable of transmitting  
23 and receiving data from user modules 252a-252n. As such, communication module 254 is  
24

1 able to "transceive" information and data to and from the various modules, components,  
2 and other hardware and/or software modules of system 250.

3       Generally, in one illustrative embodiment, communication module 254 is  
4 configured to act as an intermediary module between user modules 252a-252n and the  
5 various other modules of system 250. Communication module 254, therefore, enables user  
6 modules 252a-252n to communicate with and select one or more exercise programs,  
7 whether based on a live-on-live request or recorded exercise programs. The structures and  
8 functions related to communication module 254 will be discussed in greater detail  
9 hereinafter.

10       Optionally communicating with communication module 254 is one or more trainer  
11 modules 256a-256n. As illustrated, communication module 254 is directly communicating  
12 with trainer modules 256a-256n. Alternatively, trainer modules 256a-256n may  
13 communicate with user modules 252a-n through network 16, therefore enabling user  
14 modules 252a-252n to communicate with trainer modules 256a-256n through network 16  
15 without interacting with communication module 254, such as illustrated in Figure 1, where  
16 a user treadmill 12 may communicate directly with a trainer treadmill 20.

17       Trainer modules 256a-256n, in one illustrative embodiment, include the structures  
18 and functions of treadmill 20. Generally, trainer modules 256a-256n include one or more  
19 exercise mechanisms with one or more moveable elements that enable an individual to  
20 exercise during an exercise program, whether such exercise program requires anaerobic  
21 exercise, aerobic exercise, or a combination thereof. Additionally, trainer modules 256a-  
22 256n are configured to enable a trainer, whether a physical therapist, personal trainer, or  
23 the like to perform an exercise program substantially simultaneously with or without

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1 substantial delay with users exercising through user modules 252a-252n. Furthermore,  
2 trainer modules 256a-256n may include hardware and/or software modules and  
3 components that enable trainer modules 256a-256n to control the exercise devices  
4 incorporated within user module 252a-252n, such as treadmill 12. As such, trainer module  
5 256a-256n may include various exercise devices commonly known by one skilled in the  
6 art, and various hardware and/or software modules that enable the trainer to vary each user  
7 module 252a-252n, whether individually, collectively, or subsets of the entire group of  
8 user modules 252a-252n.

9 It may be appreciated by one skilled in the art that trainer modules 256a-256n may  
10 take various other configurations as known by one skilled in the art, in view of the teaching  
11 contained herein. For example, although trainer modules 256a-256n are depicted herein,  
12 trainer modules 256a-256n may be substituted for one or more additional user modules  
13 252a-252n. Therefore, system 250 may enable multiple users to interact one with another  
14 through network 16, without the capability to control one another. As referenced  
15 previously, it may be understood that system 10 may also enable multiple users to interact  
16 one with another through network 16, without the capability to control one another.

17 Optionally communicating with communication module 254 is a third party control  
18 module 258. Third party control module 258, in one embodiment, enables some third  
19 party such as an additional personal trainer, medical provider, development team, and the  
20 like to view the current exercise program, while having the ability to control various  
21 operating properties of user modules 252a-252n and/or trainer modules 256a-256n. For  
22 example, in a health club setting, third party control module 258 may take the form of a  
23 console operated by an individual who is able to control the operating parameters of one or  
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1 more exercise devices (e.g., during a spinning class), whether operated by a trainer or user,  
2 during an exercise program. It may be appreciated by one skilled in the art that various  
3 other configurations of third party control module 258 are applicable and known to one  
4 skilled in the art, in view of the teachings contained herein.

5 Through the illustrative configuration of control system 250 depicted in Figure 10,  
6 a user performing various exercise activities through user modules 252a-252n may  
7 communicate with trainers using trainer modules 256a-256n in real-time communication.  
8 Additionally, one user module 252a-252n may communicate with another user module  
9 252a-252n without communicating with one of trainer modules 256a-256n.

10 Generally, communication module 254 may act as and take the form of a server,  
11 with associated hardware and/or software modules to enable communication between the  
12 various modules of the illustrated system 250. As such, user modules 252a-252n, trainer  
13 modules 256a-256n, and third party control modules 210 may be considered clients of  
14 communication module 254. Alternatively, a separate server or a server network,  
15 illustrated in dotted lines and referenced by numeral 260 may communicate with  
16 communication module 254. In such a case, communication module 254 acts as a client.  
17 Generally, user modules 252a-252n, communication module 254, trainer modules 256a-  
18 256n, and third party control 210 may communicate one with another, via various  
19 communication line connections as discussed herein and known to one skilled in the art in  
20 light of the teaching contained herein.

21 Reference is now made to Figure 11, which is a more detailed schematic diagram  
22 of system 250. For ease of explanation, Figure 11 only shows one user module 252 and  
23 one trainer module 256; however it may be appreciated by one skilled in the art that a

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1 similar discussion may be made for multiple users and trainer modules 252, 256  
2 respectively.

3 As shown, in one embodiment, user module 252 includes a user interface 262.  
4 User interface 262 enables a user utilizing the beneficial characteristics of user module 252  
5 to engage and give commands thereto with respect to various operating parameters of user  
6 module 252. For example, user interface 262 may include one or more interface devices as  
7 discussed previously, such as one or more audio and video input devices 90, 92 and one or  
8 more audio and video output devices 94, 96 as described earlier herein. Therefore, user  
9 interface 262 enables the user to visually and/or audibly communicate with the trainer  
10 manipulating personal trainer module 256, various other stored programming, or other  
11 users. Consequently, user interface 262 may incorporate various structures and functions  
12 of treadmill 12, and more specifically control panel 22. Furthermore, user interface 262  
13 may incorporate various portions of translator device 13 and computer 14, such as but not  
14 limited to monitor 166, keyboard 160, mouse 162, and the like. User interface 262 is one  
15 structure capable of performing the function of interface means for gathering a first real-  
16 time signal from the user and also means for reproducing the second signal from the  
17 trainer.

18 It may be appreciated by one skilled in the art that user interface 262 and hence the  
19 interface means may take various forms or configurations to perform the desired function  
20 thereof. For example, user interface 262 and interface means may be a voice activated  
21 interface, a touch sensitive interface, an automatic monitoring system, such as a system  
22 that monitors heart rate, blood pressure, and the like and various other measurable  
23 parameters of user module 252 and a user exercising through user module 252.

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1 User interface 262, in one embodiment, communicates with exercise module 264,  
2 such as treadmill or other mechanisms having a movable element. Exercise module 264  
3 includes various hardware and software components that enable an individual to obtain  
4 aerobic exercise, anaerobic exercise, combinations thereof, or the like exercise program.  
5 For example, in one embodiment exercise module 264 is treadmill 12 with computer 14  
6 and translator device 13. Alternatively, exercise module 264 is treadmill 12 with  
7 components of computer 14 and translator device 13 therein.

8 It may be appreciated that the various modules related to user module 252 may be  
9 incorporated within exercise module 264, or more specifically within treadmill 12 or some  
10 other device. In another configuration, exercise module 264 includes a movable element,  
11 such as belt 42, that allows the user to exercise. In yet another configuration, exercise  
12 module 264 may incorporate the structure and functionality associated with user interface  
13 262 therein.

14 Communicating with exercise module 264 is a data storage module 266. Data  
15 storage module 266, in one embodiment is a database of operating parameters for exercise  
16 module 264 with respect to one or more exercise programs. As such, data storage module  
17 266 may be a ASIC chip, programmable ROM, CD-ROM, EEPROM, PCMCIA card,  
18 compact flash card, flash bios, dynamic memory, magnetic storage disk, optical storage  
19 media, or the like. Additionally, data storage module 266 may be a hierachal, relational,  
20 or other typical database, including related database management systems (not shown).  
21 Generally, data storage module 266 contains the necessary data and information to operate  
22 exercise module 264 in accordance with a selected program by a user operating user  
23 module 252 or alternatively to perform the necessary exercise program designated by the  
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operator of training module 256. Furthermore, data storage module 266 may store programming retrieved from communication module 254 in preparation for activation of exercise module 264 upon a request from a user, communication module 254, or trainer module 256. Data storage module 266 may be incorporated within exercise module 264 such as when user interface 262, exercise module 264, and data storage module 266 are part of treadmill 12, whether or not translator device 13 and/or computer 14 is integrally formed therewith.

Communicating with exercise module 264 is a safety module 268. Safety module 268 optionally communicates with storage module 224. Safety module 268 is intermediate between an interface module 270 and exercise module 264 and controls the data transferred through network 16 from communication module 254. As such, safety module 268 tracks the information delivered from communication module 254 and automatically engages a program stored within data storage module 266 upon disengagement of the connection with communication module 254 through interface module 270, thereby delivering one or more safety signals to exercise module 264. Alternatively, safety module 268 may maintain the operating parameters of exercise module 264 at the same level as before disengagement of user module 252 from communication module 254, thereby sending safety signals that maintain the operating parameters of exercise module 264 at the same level as before interruption of the programming. In yet another configuration, safety module 268 sends one or more safety signals that slowly decrease all the operating parameters of exercise module 264 to either a user defined or communication module 254 defined base level or to zero upon disengagement of user module 252 from communication module 254. As such, safety module 268 may include various hardware and/or software

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1 components and modules necessary to perform the desired function, such as but not limited  
2 to a buffer to store programming received from communication module 254. Therefore,  
3 safety module 268 is one example of a safety mechanism that is capable of manipulating  
4 the operating parameters of the exercise mechanism in the event that a packetized second  
5 control signal is interrupted. As such, safety mechanism may generate one or more safety  
6 signals to operate the exercise mechanism, as discussed herein. Safety module 268 is  
7 another example of communicating mechanism of the present invention.

8 Interface module 270, connected to safety module 268, manipulates the information  
9 and data transceived through user interface 262, whether such data is to be delivered to  
10 exercise module 264 or for delivery to communication module 254 through network 16.  
11 As such, interface module 228 performs various operations on the data, such as but not  
12 limited to encrypting data, decrypting data, buffering data, packetizing data, depacketizing  
13 data, and the like. Interface module 270 is one example of a communicating mechanism,  
14 communicating with the interface, the communicating mechanism enabling real-time  
15 transmission of the first signal to a trainer, the communicating mechanism receiving a  
16 packetized second real-time signal. In addition, interface module 270 is an example of  
17 structure capable of performing the function of a communicating means, communicating  
18 with the interface means, for receiving a packetized second signal, and optionally, for  
19 enabling transmission of the first signal.

20 It may be appreciated by one skilled in the art that there are various other  
21 configurations of interface module 270 and hence communicating means. For example,  
22 interface module 270 may facilitate communication be data between one or more users  
23 rather than between user module 252 and trainer module 256.

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1        Generally, each of the modules referenced as being included within user module  
2        252 may be integrally formed with treadmill 12 or exercise module 264. Those modules  
3        may, alternatively, be added to or installed within an existing exercise device to allow the  
4        same to communicate with communication module 254. Therefore, the particular  
5        functions of each of the modules referenced within user module 252 may vary depending  
6        on the particular characteristics and properties of the exercise device. Similarly, user  
7        module 252 may include various other modules that may be appropriate, as understood and  
8        may be identified by one skilled in the art.

9        User interface 262, safety module 268, data storage module 266, and/or interface  
10      module 270 are examples of a controller, responsive to the packetized second real-time  
11      signal, configured to control the operating parameters of the exercise mechanism (or  
12      exercise module) in real time. Additionally, such controller is a structure capable of  
13      performing the function of control means, communicating with the exercise mechanism (or  
14      exercise module), for receiving one or more packetized control signals from the  
15      communication system (or communication module) indicative of the selected exercise  
16      program and for changing one or more operating parameters of the exercise mechanism (or  
17      exercise module) based upon the selected exercise program and the one or more packetized  
18      control signals. It may be appreciated by one skilled in the art that the control means may  
19      have various other configurations.

20      Communicating with user module 252 via network 16 is communication module  
21      254. As shown, communication module 254 includes a communication user interface  
22      module 272 that transceives data, such as audio, video, and control signals between user  
23      module 252 and communication module 254. Communication user interface module 272  
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1 may have various forms, such as but not limited to those described herein with respect to  
2 interface 190. Additionally, communication user interface module 272 may include  
3 various hardware and/or software modules and components to encrypt data, decrypt data,  
4 buffer data, packetize data, and depacketize data, and the like.

5 Communicating with communication user interface module 272 is control module  
6 274 that may have a similar configuration and function to control processor 192 in Figure  
7 8. Control module 274 performs many of the functions recited with respect to control  
8 processor 192, in that control module 274: (1) manipulates the data to be transmitted to  
9 user module 252, (2) enables the user to select one of a plurality of different programs,  
10 whether such programs are stored or live, such as those stored in memory 278, (3) requests  
11 the creation of control signals by control signal generation module 282 which may be  
12 synchronized with the exercise programs, (4) transmits data between one or more user  
13 module 252, between a one or more user modules 252 and trainer module 256 via  
14 communication trainer interface module 276, between one or more user modules 252  
15 and/or third party module 258, and the like. Additionally, control module 274 may access  
16 data that is stored in one or more memory modules: memory 194 and external memory  
17 196.

18 Furthermore, control module 274, may automatically disconnect data  
19 communication between user module 252 and communication module 254 when the  
20 movable element of exercise module 264 is stopped by the user. For example, in a gym  
21 type setting, once an individual connects to communication module 254, and/or  
22 communication system 18, control module 274 provides access to communication module  
23 254 with associated programming. As a user exercises, control module 274 tracks the  
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1 active status of the movable element of exercise module 264 to determine whether the user  
2 is continually exercising. When the user activates, through user interface 262, stop/pause  
3 button 78 (Figure 6), control module 274 disconnects the user from communication  
4 module 254. Furthermore, control module 274 clears the temporary data file stored in  
5 storage module 224 of user module 252 and may also clear the temporary data files stored  
6 in communication module 254 that relate to the particular user. In this way, control  
7 module 274 prepares user module 252 and communication module 254 for use by  
8 subsequent users. Although the above discussion is directed to control module 274, it may  
9 be appreciated by one skilled in the art the control processor 192 may perform the same  
10 function with control processor's hardware and/or software modules and components.

11 Control signal generation module 282 may have a similar configuration to that of  
12 control signal generator 200 (Fig. 8), so long as control signal generation module 282 is  
13 capable of creating one or more control signals that may be synchronized with the audio  
14 and video signals retrieved from memory 194, 196 or received through communication  
15 trainer interface 276 from trainer module 256.

16 Trainer module 256 has substantially the same configuration as that of user module  
17 252. Therefore, trainer module 256 includes an interface module 284 for transceiving data  
18 between trainer module 256 and communication module 254. Communicating with  
19 interface module 284 is an exercise module 286 and optionally a data storage module 288.  
20 Furthermore, trainer module 256 includes a trainer interface 290 that enables a trainer to  
21 input various exercise parameters to change the operating parameters of user module 252.  
22 Trainer interface 290, therefore, may include the various input devices recited previously  
23 with respect to user module 252 and/or treadmill 12.

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1 Trainer module 256 optionally includes a control signal generation module 292.  
2 Control signal generation module 292 enables trainer module 256 to generate control  
3 signals that are synchronized with the audio and/or video signals that are transmitted from  
4 trainer module 256 to user module 252. Control signal generation module 292, therefore,  
5 is substantially the same as control signal generation module 282.

6 The synchronization of the audio and/or video signals with the control signals may  
7 be achieved in a variety of different manners. For example, in one embodiment of such  
8 synchronization, the audio and/or video signals indicate that the treadmill speed will move  
9 from 1 mile per hour to 5 miles per hour. The control signal may not automatically move  
10 the speed to 5 miles per hour, but may instead ramp gradually from 1 mile per hour to 5  
11 miles per hour. Optionally, the control signal and video/audio signals are synchronized  
12 such that a message increasing to a given speed is instantaneously matched by the exercise  
13 device.

14 Following hereinafter is a discussion of the various optional modules that may be  
15 incorporated within communication module 254, in addition to those discussed earlier. It  
16 may be appreciated by one skilled in the art, that communication module 254 includes the  
17 typical user interfaces and communication interfaces for enabling user module 252a-252n  
18 to communicate with training module 256a-256n and optionally another user module 252a-  
19 252n. Generally, therefore, communication module 254 includes various other functional  
20 modules. Additionally, the following discussion describes various functions of  
21 communication system 18 and its interaction with a user at treadmill 12, computer 14,  
22 translator 13, third party 21, and/or a trainer at treadmill 20

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1 As shown in Figure 12, communication module 254 (Figure 11) includes, in one  
2 embodiment, an iFit.com website 300 that acts as both an interface with the user, while  
3 also controlling the operation of user module 252a-252n and/or trainer module 256a-256n.  
4 As such, iFit.com website 300 is in communication with a number of various other  
5 modules forming one embodiment of communication module 254. Each module depicted  
6 may represent functionality included within communication module 254, while  
7 representing structural hardware and/or software modules that may either be incorporated  
8 within the hardware and software modules of iFit.com website 300, or alternatively,  
9 accessible by the hardware and software modules forming iFit.com website 300.

10 Generally, the iFit.com website 300 is hosted on one or more computers, whether a  
11 general-purpose or special-purpose computer, that may have the form of computer 14, or  
12 any variation thereof known by one skilled in the art in view of the teaching contained  
13 herein. As such, the hardware and software modules forming iFit.com website 300 may  
14 include those listed herein with reference to computer 14. As depicted in the illustrative  
15 configuration of Figure 12, iFit.com website 300 may include login-registration module  
16 302, audio program module 304, video program module 306, health information module  
17 308, consumer purchase module 310, personal training module 312, competition module  
18 314, diagnostic module 318, program generation module 318, advertising module 320, and  
19 links module 322.

20 According to one aspect of the present invention, communication module 254  
21 includes a login-registration module 302 that is accessible via iFit.com website 300.  
22 Login-registration module 302 is configured to obtain the necessary registration and login  
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1 information from a user wishing to use communication module 254 and the various  
2 audio/video and literary information contained therein, with their exercise device.

3 Referring now to Figure 13, a flow diagram illustrating the operation of login-  
4 registration module 302 is depicted. Initially, login-registration module 302 identifies  
5 whether the user has logged into the communication module 254 before, as represented by  
6 decision block 330. In the event that the user is accessing or "logging in" to iFit.com  
7 website 300 for the first time, login-registration module 302 gathers the user information,  
8 as shown by block 332. Specifically, login-registration module 302 may gather the user's  
9 name, age, sex, type of exercise equipment being used, and various other data unique to the  
10 user. Additionally, login-registration module 302 may present the user with multiple  
11 questions to obtain statistical information regarding the user's background, education,  
12 work experience, income, hobbies, and other related information to aid operators of  
13 communication module 254 and system 250 in providing greater instructional information  
14 to the user. Furthermore, such statistical information may also be used in targeting specific  
15 advertisement to the individual during an exercise program.

16 As information is gathered from the user, payment information, such as credit card  
17 numbers, accounts, and the like may further be obtained from the user. Alternatively, as  
18 depicted in Figure 12, the step of obtaining payment information may follow the gathering  
19 of the user information, as shown by block 334. Once all the necessary information is  
20 gathered, login-registration module 302 assists the user in defining a login user  
21 identification number (user ID) and password that are unique to the particular user, as  
22 depicted by block 336. Upon defining the user password and user ID communication  
23 module 254 stores the information within a memory of communication module 254 and

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1 optionally user module 252. The user is subsequently asked to login to communication  
2 module 254.

3 Following the logging in procedure, the user is given access, as depicted by block  
4 340, to communication module 254 to the specific level that they are allowed, based upon  
5 their responses to the various questions asked during the login procedure. For example, if  
6 a user defines the exercise device as a treadmill located at home, the user may be limited to  
7 only the treadmill related web pages of iFit.com website 300. Similarly, if a user does not  
8 define any account information the user may be limited to only the free web pages and  
9 information available thereon, while being restricted to access the fee-based web pages,  
10 such as to purchase exercise profiles, exercise equipment, and the like.

11 Referring again to decision block 330, if a user accesses communication module  
12 254 for a second or any other subsequent times, decision block 330 is in the negative, and  
13 login-registration module 302 gathers the user ID and password from the user, as depicted  
14 by block 342. Upon gathering the user ID and password, login-registration module 302  
15 verifies the user ID and password with the stored user ID and password, as represented by  
16 block 344. Subsequently, login-registration module 302 either rejects access to  
17 communication module 254 or alternatively allows access thereto with the specific level of  
18 access, as shown by blocks 346 and 340.

19 It may be appreciated by one skilled in the art, that various other functionality and  
20 structures might form login module 302. For example, login-registration module 302 may  
21 incorporate various processors, micro-controllers, logic circuits, and the like to analyze and  
22 store the information input during a login process. In one configuration, login-registration  
23 module 302 may communicate with user module 252 during the login process to verify  
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1 that the exercise device used by the user is the same as previously indicated by the user  
2 during previous logins. In the event that the exercise device differs, whether by type,  
3 model or the like, login-registration module 302 may cause communication module 254 to  
4 either prompt the user to change the stored login information, thereby varying the access to  
5 the various programs, or automatically change the login information and associated access  
6 in light of the changed exercise device.

7 In another configuration, login-registration module 302 may be a separate hardware  
8 and/or software module or component that is located distantly from the hardware and/or  
9 software components or modules of communication module 254. In still other  
10 configurations, login-registration module 302 may be further adapted to store information  
11 regarding the use of exercise equipment. For example, login-registration module 302 or  
12 some other module of communication module 254 may track the amount of time that a  
13 user spends exercising on a particular type of exercise device, thereby determining a user's  
14 exercising preferences.

15 Furthermore, login-registration module 302 may track the particular locations  
16 where the user trains to identify a user profile of the user's exercise activities throughout  
17 the United States of America or the World. Such information may then be used to provide  
18 the user with specific information related to those locations where the user exercises most.  
19 For example, the user may receive targeted advertising to exercise and non-exercise related  
20 businesses or services within the city or state of the place where the individual commonly  
21 visits or exercises.

22 Referring back to Figure 12 communication module 254 includes an audio program  
23 module 304. Generally, audio program module 304 is configured to provide the user with  
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1 multiple selections of audio programs that are available for particular types of exercise  
2 device. Additionally, audio program module 304 allows the user to purchase copies of the  
3 audio programs that may be performed on line.

4 As depicted in Figure 14, audio program module 304 allows the user to select from  
5 various types of exercise devices with associated audio programs. As illustrated, audio  
6 program may have separate information for treadmills, ellipticals, cycles, steppers, hikers,  
7 climbers, Nordic type exercise devices, and various other types of exercise devices known  
8 by one skilled in the art. As such, a user may manually select the particular exercise  
9 device to be used. Alternatively, audio program module 304 may dynamically select the  
10 particular exercise device and the various audio programs applicable to the user's exercise  
11 device by analyzing the user information gathered by login-registration module 302. No  
12 matter the manner by which the particular exercise device is selected, Figure 15 depicts an  
13 illustrative flow diagram that depicts possible user selections and data flow related to  
14 accessing the one or more audio programs available through communication system 18,  
15 and more specifically iFit.com website 300.

16 As shown, upon selecting a particular exercise device (whether manually or  
17 dynamically as discussed above), as depicted by block 350, the user is allowed to select the  
18 type of music to be played during the program session, as depicted by block 352. Once the  
19 user has selected the particular music type, the user is given the option to view the program  
20 information to determine if the difficulty level is too great, as depicted by decision block  
21 354. For example, if the individual wishes to view the exercise program profile,  
22 communication module 254 packetizes an audio and/or graphical representation of the  
23 exercise program selected (i.e., the maximum speed, maximum incline, time to perform the  
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1 exercise program, amount of time at each maximum speed and incline, and various other  
2 operating parameters known to one skilled in the art) and transmits the data to either the  
3 integrally formed video output device 92 (Figures 1 and 6) mounted on treadmill 12, or  
4 alternatively, to monitor 166 (Figure 7) associated with computer 14 for review by the  
5 user, as depicted by block 356.

6 Alternatively, the user may decide not to view the user profile, such that the  
7 response to decision block 354 is in the negative. Whether or not the user views the  
8 exercise profile, the user may select to begin the online exercise program, as depicted by  
9 decision block 358. If the user selects in the affirmative, communication module 254  
10 delivers the audio signals, with control signals, to user module 252 in accordance with the  
11 selection. Consequently, communication module 254 may download the entire audio  
12 program to user module 252, or alternatively "stream" the audio signals thereto by a  
13 manner known by one skilled in the art. Upon completion of the program, as depicted by  
14 block 360, the user is given the opportunity to purchase their own copy of the audio  
15 program just performed, as represented by decision block 364. In the event they decline to  
16 purchase the program session, the particular audio program session is completed and the  
17 user is optionally returned to the homepage of iFit.com website 300.

18 Referring again to decision block 358, if the user selects not to perform the online  
19 program, the user may optionally select to purchase the program, as depicted by decision  
20 block 364. If this selection is in the negative, the user is returned to the homepage of  
21 iFit.com website 300. Otherwise, if the user wishes to purchase the program, audio  
22 program module 302 gathers account information, as depicted by block 366 and media  
23 format, such as CD, tape, MP3 file, or the like, as depicted by block 368. Furthermore,  
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1 audio program module 304, through video output device 90 or monitor 166 displays the  
2 pricing guides for various types of media and/or associated mailing costs, as depicted by  
3 block 370. Alternatively, audio program module 304 may interface with an accounting  
4 module that performs the function of storing and collecting account information and  
5 purchase information from any of the various modules associated with communication  
6 module 254. As such, communication module 254 may have a centralized accounting  
7 module that is accessible by one or more of the various modules forming communication  
8 module 254. Furthermore, in another alternate configuration, audio program module 304  
9 may communicate with login-registration module 304 and obtain account information  
10 therefrom.

11 Referring again to Figure 12, communication module 254 further includes video  
12 program module 306. Video program module 306 uses a similar flow of information and  
13 related functional operations as audio program module 302; however, video program  
14 module 306 merely gives video options to the user, whether such video options include or  
15 exclude audio programs transposed or incorporated therein. Therefore, instead of selecting  
16 a music type, video program module 306 enables a user to select a video program session  
17 and receive real-time or streamed video and/or audio signals. Similarly, in the event the  
18 user wishes to purchase the video program, video program module 306 enables the user to  
19 select a particular type of video format such as CD ROM, DVD, video tape, MP3 file, and  
20 the like.

21 According to another aspect of the present invention, communication module 254  
22 includes a health information module 308. Health information module 308, in one  
23 embodiment, includes a searchable database of information related to health issues for  
24

1 those exercising and/or those who wish to begin to exercise using communication module  
2 254. As such, in one configuration, health information module 308 is a distantly located  
3 database, such as a relational, hierachal, or some other database that is accessible by the  
4 iFit.com website 300. Alternatively, health information module 308 may be incorporated  
5 within the hardware and/or software components and modules hosting iFit.com website  
6 300.

7 Communication module 254 may optionally include a consumer purchase module  
8 310. Consumer purchase module 310 is configured to enable a user to purchase exercise  
9 equipment, materials such as books and instructional materials, nutritional supplements,  
10 and the like online. Consumer purchase module 310 may, therefore, link directly to one or  
11 more affiliates of communication module 254. Alternatively, consumer purchase module  
12 310 may include a database, whether relational, hierachal, or the like that has stored  
13 specifications, pricing guides, illustrative images of exercise devices and products, and the  
14 like, that a user may search through to find the necessary or desired exercise equipment.  
15 Additionally, consumer purchase module 310 may include the necessary hardware and/or  
16 software modules to gather and store billing and purchase information from the user or  
17 alternatively, consumer purchase module 310 may communicate with a centralized  
18 accounting module that performs the necessary functions typically known by one skilled in  
19 the art related to accounting, billing, purchasing, sales, and the like activities.

20 According to another aspect of the present invention, communication module 254  
21 includes a personal training module 312. Personal training module 312 enables a user to  
22 interact with a personal trainer on a live-on-live exercise session whether in a one on one  
23 session or in a group setting. Additionally, personal trainer module 312 enables the user to  
24

1 ask questions and receive communications from one or more personal trainers related to  
2 exercise advice, techniques, and programs, whether or not in real-time.

3 Referring now to Figure 16, a schematic representation of the various illustrative  
4 functional modules of personal training module 312 are illustrated. As shown, personal  
5 training module 312 includes a scheduling module 380 that enables various individuals to  
6 schedule times to talk to and optionally perform a live workout program. Scheduling  
7 module 380 enables the user to access a profile module 382 that contains one or more  
8 trainer profiles. In this way, personal training module 312 enables a user to review the  
9 profiles of the various trainer to select the particular trainer that best suits the users needs  
10 and/or time requirements. Profile module 382 may, therefore, include a database, whether  
11 relational, hierarchical, or the like, or some other data storage hardware and/or software  
12 that is capable of storing data in an accessible form.

13 Scheduling module 380, in one embodiment, communicates with a calendaring  
14 module 384 that lists the days of the month and the particular times available for one-on-  
15 one exercise programs with each trainer. Additionally, calendaring module 384 may list the  
16 times of group sessions and enable a user to select a particular session time reference  
17 within calendaring module 384 for the user to exercise with a personal trainer.

18 As shown, scheduling module 380 may communicate with a mailbox module 386  
19 that includes multiple mailboxes, one for each user and trainer. Each mailbox may receive  
20 email from trainers and other users of communication module 254, or alternatively, only  
21 trainers or communication module 254 may deliver a message 388 to each user, such as  
22 electronic mail. Generally, each mailbox is configured to receive messages from the  
23 trainers regarding schedule one-on-one exercise sessions or group sessions. Additionally,  
24

1 communication module 254 or iFit.com website 300 may deliver notifications of upcoming  
2 special group exercise session, or other information related to the user and/or exercising.  
3 Each user and/or trainer may save unique exercise programs created by the user and/or the  
4 trainer within data storage 390 accessible by mailbox module 386. Optionally, data  
5 storage 390 may correspond to memory 278 (Figure 11) or other external memory that is  
6 accessible to mailbox module 386.

7 Communicating with personal training module 312 is a video conferencing module  
8 392. Video conferencing module 392 provides the functional hardware and/or software to  
9 allow a user to videoconference with a personal trainer. For example, video conferencing  
10 module 392 may include various hardware and/or software modules that: (1) assist with  
11 data transmission of audio and/or video signals between user module 252a-252n and  
12 trainer module 256a-256n; (2) assist with image and voice capturing; (3) packetizing or  
13 depacketizing data, and the like, such as those discussed with respect to system 10, or  
14 otherwise known to those skilled in the art in light of the teaching contained herein.  
15 Additionally, video conferencing module 392 allows the user to videoconference with the  
16 personal trainer in either a private room, as represented by numeral 394 or in a public  
17 room, as represented by numeral 396. In either case, (i.e., in the private or public room)  
18 the user may exercise with the personal trainer in a one-on-one or group setting.

19 It may be appreciated by one skilled in the art, that the functionality described  
20 herein with respect to personal training module 312 may be varied and is only illustrative  
21 of one possible embodiment thereof. Other functionality and associated structures such as  
22 hardware and/or software modules may be included within personal trainer module 312.  
23 Furthermore, various other linkages may occur between the various functional modules of

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1 personal training module 312. For example, in one alternate embodiment, calendaring  
2 module 384 is linked with private room 394 such that upon scheduling a one-on-one  
3 exercise program, a private room is automatically scheduled for the user. Additionally,  
4 calendaring module 384 may automatically send a message to the user's mailbox, thereby  
5 providing the user with information regarding the particular private room scheduled and a  
6 reminder of the schedule time.

7 According to another aspect of the present invention, as illustrated in Figure 12,  
8 iFit.com website 300 includes a competition module 314. Competition module 314  
9 enables one or more individuals to engage in competitive exercise programming with one  
10 another or alternatively with the communication module 254 hosting iFit.com website 300.  
11 Such competitive exercise programming motivates the users to exercise on a more regular  
12 basis while also setting goals for the individual to reach. Competition module 314,  
13 therefore, provides various benefits to those seeking to exercise on a regular basis.

14 Referring now to Figures 17A-17D, a flow diagram representing one illustrative  
15 operation of competition module 314 is depicted. As shown, a user selects the particular  
16 race types that they wish to engage in, as depicted by block 400. Three types of races are  
17 depicted; race around the world 402, race against the computer 404, and personalized race  
18 406; however various other race types are applicable and known to one skilled in the art, in  
19 view of the teaching contained herein.

20 One particular race type is a race around the world. In the race around the world  
21 type race, an individual races against various other individuals to determine who will run  
22 around the world in the shortest time. Communication module 254 tracks the exercising  
23 activities of competing users of user modules 252a-252b and computes the distance  
24

1 traveled per exercise session and per user. A running total of the distance traveled is  
2 maintained and updated. Each competitor may compare the total distance traveled against  
3 other competitors to see who runs a number of miles equivalent to running around the  
4 world in the shortest time.

5 With reference to Figure 17A, when the race around the world race type is selected,  
6 competition module 314 retrieves the stored statistical information of the user, as depicted  
7 by block 410. The statistical information may include, but is not limited to, distance  
8 traveled by the user, average speed of the user, and the like. Once competition module 314  
9 selects the stored statistical information, such information may be compared against other  
10 competitors in the race, as depicted by block 412. Competition module 314 may deliver  
11 comparison data to communication module 254. In turn, communication module 254 may  
12 deliver a graphical representation of the user's exercise distant, times, speed, and other  
13 information compared against other competitors to the user via user module 252a-252n. A  
14 user module 252a-252n or a user operating treadmill 12, for example, may view their  
15 distance and times with respect to other competing users of user modules 252a-252n,  
16 thereby being motivated to exercise more. Once such information is depicted, the user  
17 may modify their existing exercise programs to either increase or decrease exercise  
18 parameters of the programs. For example, if the user sees that they have not run as many  
19 miles as other competitors, they may increase the distance to be run in the future. Once the  
20 user is ready, the user may begin or continue the race, as represented by block 414. As the  
21 user exercises communication module 254 records new statistical information for the user,  
22 such as speed, distance traveled, calories used, and the like.

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1 It may be appreciated by one skilled in the art that various other configurations of  
2 the race around the world type race are applicable and known to one skilled in the art. For  
3 example, in another configuration of the race around the world type race, a user may select  
4 a particular time period, say from January 1 to February 1, and race against others to see  
5 who travels the furthest distance within the given time period. Again, communication  
6 module 254 tracks the distance traveled of each competitor and may provide graphical  
7 representations of the position of one competitor against the other competitors. In still yet  
8 another configuration, the race around the world may include racing over various types of  
9 terrain ranging from deserts, mountains, and the like. As such, each competitor follows a  
10 similar overall exercise profile and communication module 254 tracks the time that a user  
11 takes to complete the race, for example, when a user slows down the treadmill based upon  
12 the terrain traversed.

13 Referring again to Figure 17A, the user may optionally select to race against the  
14 computer, as referenced by block 404. As the name of the race type suggests, this option  
15 enables the user to select a particular type of race and a particular skill level of the  
16 computer against which to race. As shown in Figure 17C, a user selects the difficulty level  
17 for the particular race, as represented by block 416, such as in the case of a treadmill, the  
18 speed, incline, distance, and the like. This may also enable the user to select a particular  
19 skill level of the computer, such as a beginner runner, intermediate runner, or advanced  
20 runner. Additionally, the user may select various other options, as represented by block  
21 418, such as a head start for the computer or the user, scaling of the particular difficulty  
22 level, and the like. Upon completing the selections, the user may race against the  
23 computer, as represented by block 420.

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1       With reference to Figure 17A, another type of race is a personalized race, as  
2 depicted by block 406. In the personalized race, two or more individuals schedule a live  
3 on live session, such as in a private room of personal training module 312 where they may  
4 race one against the other, while viewing graphical representations of the distant, time, and  
5 speed of the other competitors. Alternatively, two or more individuals may schedule a race  
6 where the start time is adjusted based upon the particular location of the competitors.

7       As shown in Figure 17D, a user may select a time-adjusted race, as depicted by  
8 decision block 422. If the user rejects time adjustment, then the user will race against one  
9 or more competitors in a live-on-live competition. The user selects one or more  
10 competitors, as referenced by block 424. Following the selection, each competitor enters a  
11 private room to begin the race and to synchronize each competitor's exercise device with  
12 communication module 254 and each other, as depicted by block 426. Alternatively, each  
13 competitor may merely enter the private room that has been scheduled for the race, thereby  
14 automatically selecting each competitor for the race, while synchronizing each  
15 competitor's exercise device in block 426 in preparation for beginning the race as depicted  
16 by block 428.

17       Synchronization prepares the communication links between each competitor and  
18 generates the displays and data flow therebetween, such as but not limited to the audio and  
19 video data flows and displays that enable each competitor to view their progress against  
20 each other. For example, the display may include a racing track that shows a relative  
21 position of each competitor one with another, or a trail that each competitor races along. It  
22 may be appreciated that various other data flows and displays are appropriate and known to  
23 one skilled in the art in view of the teaching contained herein.

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1 As suggested above, the user may select a time-adjusted race. The time-adjusted  
2 race allows two or more competitors to conveniently race against each other. For example,  
3 the time-adjusted race allows an individual on the east coast to race against individuals in  
4 the Mountain Time zone and the west coast at the same local time, for example 5:00 p.m.  
5 The time-adjusted race, therefore, stores the race of one individual, say the individual on  
6 the east coast who races at 5:00 p.m. and then rebroadcasts the stored exercise race to those  
7 other individuals in various other time zones upon reaching the designated time period,  
8 such as 5:00 p.m. Mountain Standard Time, pacific time, and the like.

9 With reference to Figure 17D, for ease of explanation, let us assume that three  
10 individuals, one on the east coast, one in the Mountain Time zone, and one on the west  
11 coast wish to race against each other at 5:00 pm local time. Each competitor accesses  
12 communication module 254 and selects each other as competitors, block 430, in a time-  
13 adjusted race, as depicted in decision block 422. Each competitor defines the particular  
14 time period or adjusted time at which each individual is to race, as depicted by block 432.  
15 The selections and adjusted times for each competitor are stored in one or more databases  
16 or other storage modules associated with an identification number given to the time-  
17 adjusted race or directly to each competitor. Once the information is entered and stored,  
18 the competitor on the east coast may perform their race on their own or with the aid of a  
19 pace setter generated by the computer at the appointed time, as depicted by block 434.  
20 Once the east coast competitor finishes their race, the statistical information and a real-time  
21 representation of the race is stored, as represented by block 436. Upon the arrival of the  
22 adjusted time for the Mountain Time zone competitor to race, communication module 254  
23 will rebroadcast the particular race performed by the east coast competitor to the Mountain  
24

1 Time zone competitor. Similarly, upon the time for the west coast competitor to race,  
2 communication module 254 will rebroadcast the particular race performed by the east coast  
3 competitor and optionally the Mountain Time zone competitor to the west coast  
4 competitor. It may be appreciated by one skilled in the art that the live on live and time-  
5 adjusted races may be performed in a variety of different manners. For example, the time  
6 number of competitors is not limited to any specific number. Additionally, the time  
7 adjustments may allow for competitors throughout the world to race one against another.

8 It may be appreciated by one skilled in the art that competition module 314 may  
9 have various other configurations. For example, the functionality of competition module  
10 314 may be incorporated within user modules 252a-252n. As such, two or more user  
11 modules 252a-252n may be in direct communication one with another, without the aid of  
12 communication module 254, and the internal modules of user modules 252a-252n enable  
13 competition data to be transceived between the user modules 252a-252n.

14 With reference again to Figure 12, communication module 254 further includes a  
15 diagnostic module 316. Diagnostic module 316 enables the user to perform a diagnostic  
16 analysis of their particular exercise device or product in the case of disconnection or  
17 changes in the operation of their exercise device or product. Additionally, diagnostic  
18 module 316 enables the user to update and change operational parameters of the user's  
19 exercise device or product, either through manual activation of diagnostic control 88  
20 (Figure 6) or automatically through communication module 254. For example, in the event  
21 a new software update is available for the particular exercise device's software,  
22 communication module 254 may automatically recognize operation of the update and  
23 deliver the same to each individual having an exercise device or product that may benefit  
24

1 from updating of the software. Additionally, the diagnostic module 316 may identify  
2 problems with the exercise device and subsequently schedule arrival times for maintenance  
3 workers to resolve physical problems that are unable to be fixed by remote communication  
4 from communication module 254.

5 As such, referring now to Figure 18, an illustrative flow diagram representing  
6 diagnostic module 316 is depicted. As shown, a user is asked to select whether they wish  
7 to update their product, as depicted by decision block 440. Alternatively, communication  
8 module 254 may automatically recognize that the exercise device or product is to be  
9 updated, therefore eliminating block 440 from the flow diagram. In the event that the user  
10 wishes to update the exercise device or product, communication module 254, and more  
11 specifically diagnostic module 316, connects directly to user module 252a-252n via  
12 network 16 (Figures 1 and 10), as depicted by block 442. Such connection may be  
13 achieved by a variety of manners, as known by one skilled in the art and also discussed  
14 herein. Upon connecting to user module 252a-252n or product, diagnostic module 316  
15 verifies that particular hardware and/or software modules are contained therein, as shown  
16 by block 444. In the event that software or read/write hardware may be updated, the  
17 necessary executable file is either streamed or downloaded to user module 252a-252n, as  
18 referenced by block 446. Upon receiving the downloadable file, user module 252a-252n  
19 executes the executable file to update the hardware and/or software components therein, as  
20 referenced by block 448. Alternatively, such as in system 10 (Figure 1), the downloadable  
21 file may be downloaded to computer 14 which may execute the program and update  
22 treadmill 12 remotely.

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1 Referring again to decision block 440, when the user answers in the negative, the  
2 user is subsequently queried as to whether they are having difficulty with their exercise  
3 device or product, as identified decision block 450. Upon answering in the affirmative,  
4 diagnostic module 316 queries the user, as depicted by block 452, as to the difficulties they  
5 are having and what attempts if any, they have made to resolve the problem. Upon  
6 gathering the necessary information, diagnostic module 316 connects to the exercise device  
7 or other device, as depicted by block 454, and thereafter analyzes the various hardware and  
8 software problems to resolve and identify whether it is possible to remotely fix the  
9 problem, as depicted by blocks 456 and 458. In the event that the exercise device or  
10 device may be remotely corrected, through an update, as depicted by decision block 460,  
11 diagnostic module 316 will then perform the steps of updating as previously described in  
12 block 442, 444, 446, and 448. Alternatively, if the problem may not be corrected through  
13 remote access, diagnostic module 316 may automatically schedule a time for physical  
14 maintenance of the device or product. It may be appreciated by one skilled in the art, that  
15 various other functionality may be performed by diagnostic module 316.

16 In an alternate configuration, when user module 252 (Figure 10) is placed in the  
17 active status (e.g. turned on) user module 252 may optionally analyze its internal hardware  
18 and/or software modules to verify that such modules are operating correctly. In the event  
19 that one or more problems occur, diagnostic module 316 answers decision block 440 in the  
20 affirmative, thereby automatically obtaining an update from communication module 254  
21 (Figure 10) or alternatively manually requesting information from the user. Optionally,  
22 when a user of user module 252 accesses communication module 254 (Figure 10),  
23  
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1 communication module 254 activates diagnostic module 316 (Figure 12) to analyze user  
2 module 252.

3 Referring again to Figure 12, according to another aspect of the present invention,  
4 communication module 254 enables a user to prepare a personalized audio and/or video  
5 exercise program. Communication module 254, therefore, includes program creation  
6 module 318. Program creation module 318, referring now to Figure 19, enables a user to  
7 select an audio program session, as depicted by decision block 470 and/or a video program  
8 session, as depicted by decision block 478. In the event that only an audio program  
9 session is desired, the user initially selects the type of exercise device that the program is to  
10 be used, such as but not limited to treadmills, cycles, steppers, hikers, climbers, Nordic  
11 style devices, ellipticals, and the like, as represented by block 472. Upon selecting the type  
12 of device, the user may then select a specific type of music, such as rock, pop, country,  
13 jazz, classical, alternative, or the like, that is to be used with the exercise program, as  
14 represented by block 474. Once a particular music type is selected, the user may then  
15 generate an exercise profile that the exercise device will follow during the exercise  
16 program, as depicted by block 476. Generation of the exercise profile may include  
17 defining one or more operating parameters of the exercise device, such as the speed and  
18 inclination of the tread base for a given period of time. Upon finalizing the exercise  
19 program, the user may then store the program, as represented by block 488, such as in their  
20 mailbox, on their exercise device, on a computer readable media, or the like.

21 In the case of a video program, the user again selects the particular type of exercise  
22 device to be used in association with the exercise programming, as represented by block  
23 480. Upon selecting the exercise device, the user may select a particular video  
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1 presentation they desire, as represented by block 482. The video presentation includes any  
2 type of motivational programming known to those skilled in the art. For example, and not  
3 by way of limitation, the video presentation may include natural scenes, such as  
4 mountains, oceans, streams, and the like, exercising individuals, educational programming,  
5 abstract images, and the like. It is preferred that each video presentation includes a  
6 specific sound track; however, the user may modify a particular audio track that is  
7 synchronized with the video presentation or optionally generate a completely new audio  
8 track, according to block 484. Once the video program, and optional music program, is  
9 selected, the user may subsequently generate an exercise profile, as represented by block  
10 486, in a similar manner to that described above. As with the audio program, the video  
11 program may be stored for use at subsequent times, as depicted by block 488.

12 The presently described invention may be used in a variety of situations to enable  
13 individuals who wish to exercise to obtain more beneficial results in a highly motivated  
14 setting. With this in mind, following hereinafter is an illustrative embodiment of an  
15 environment within which the exercise devices and modules of the presently described  
16 invention may be used.

17 Referring again to Figure 12, communication module 254 includes an advertising  
18 module 320. Advertising module 320 is adapted to retrieve the information obtained by  
19 login-registration module 302 and retrieve from memory 194 or external memory 196  
(Figure 8) advertisements that may be appropriate for the user to view in light of the  
20 selections made during the login process. In one embodiment, an audio and video  
21 advertisement signal is delivered with the audio and video exercise programming to appear  
22 on user interface 262 (Figure 11). For example, a banner may appear on user interface 262  
23 on user interface 262 (Figure 11). For example, a banner may appear on user interface 262  
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1 (Figure 11), and more specifically video display 94 (Figure 6) for the user. Such  
2 advertising may, alternatively, may take the form of an additional streaming, real time  
3 audio and video output that is linked to one or more national advertising agencies. In such  
4 a case, the banner may optionally appear for a few seconds to present a micro-commercial  
5 targeted to the user of user module 252. Upon completing the commercial, the banner may  
6 disappear, to subsequently reappear with the same or alternatively different micro  
7 commercials at various periods along an exercise program.

8 Referring again to Figure 12, communication module 254 includes a links module  
9 322. Links module 322 is configured to provide the user with a list of various additional  
10 web sites where educational and exercise information, products, materials, and the like  
11 may be viewed and/or purchased.

12 With reference now to Figure 20, a master-slave system 500 is depicted that may or  
13 may not use the systems described above to enable communication between the various  
14 components of the master-slave system as will be described in detail hereinafter. Master-  
15 slave system 500 may use various types of network, such as the Internet to enable  
16 communication between the various portions of master-slave system 500. Master-slave  
17 system 500, in this embodiment, includes a master device 502 and one or more slave  
18 devices 504a-504n communicating with master device 502. In this embodiment, master  
19 device 502 may take the form of a treadmill with a computer integrally formed therein.  
20 Alternatively, master device 502 may be a treadmill with one or more processors,  
21 controllers and memory storage devices that allow master device 502 to control one or  
22 more slave devices 504a-504n without entirely incorporating a computer therein. Master  
23 device 502, therefore, may or may not incorporate the structure and functionality of  
24

1 treadmill 20 (Figure 1) or other exercise device, communication module 254 (Figure 10),  
2 and/or trainer modules 256a-256n (Figure 10).

3 Generally, master device 502 enables an individual exercising thereupon to control  
4 one or more slave devices 504a-504n, in real-time, whether or not master device 502  
5 receives input data from the one or more slave devices 504a-504n. As depicted, master  
6 device 502 is directly linked with each of the slave devices 504a-504n via a  
7 communication line connection, such as but not limited to existing broadcast technology,  
8 including short range wireless transmissions, television broadcast over the airwaves, cable  
9 or cable modems, satellite, telephone lines, whether analog or digitally based, wireless  
10 technology, other high-speed data connections, or any other suitable transmission  
11 technology or medium. Master device 502, therefore, includes the appropriate hardware  
12 and/or software applicable to enable master device 502 to communicate and control one or  
13 more slave devices 504a-504n.

14 In one case, the internal components of master device 502, alone, are sufficient to  
15 enable communication to and control of slave devices 504a-504n. Therefore, master  
16 device 502 need not incorporate computer 14 (Figure 1), translator device 13 (Figure 1), or  
17 hardware and/or software modules of communication system 18, or communication  
18 module 254 therein. In another configuration, master device 502 may communicate with  
19 slaves 504a-504n via a network and a communication system or module so that master-  
20 slave system 500 has a similar configuration to system 250 where one or more trainer  
21 modules 256a-256n control the operation of one or more user modules 252a-252n via  
22 network 16, whether or not communication module 254 is used to facilitate such  
23 communication and control.

24

1        Each slave device 504a-504n and sub-slave device 506a-506n linked to master  
2        device 502 may take the form of an exercise device, such as treadmill 12, translator device  
3        13, and/or computer 14 of Figure 1. Additionally, each slave device 504a-504n may  
4        incorporate the structure and functionality of user modules 252a-252n. Each slave device  
5        504a-504n, therefore, may be controlled by master device 502 in real-time while enabling  
6        the user to manually override the operation of the exercise device in opposition to control  
7        signals received from master device 502.

8        As illustrated in Figure 20, each slave 504a-504n may optionally be a master to  
9        subsequent sub-slave device 506a-506n, as shown in broken lines. In such a manner,  
10       various exercise devices may be separated into different groups. For example, slave 504a  
11       may receive a beginner level control signal from master 502. In turn, slave 504a may  
12       control the operation of one or more sub-slave devices 506a-506n that are operated by one  
13       or more beginners. Similarly, slave 504b may receive an intermediate level control signal  
14       from master 502 and subsequently control one or more sub-slaves (not shown), while slave  
15       504n may receive an advanced level control signal from master 502 and subsequently  
16       control one or more sub-slaves (not shown).

17       According to another alternate configuration, master device 502 may receive  
18       information from each slave device 504a-504n representative of the user's heart rate, blood  
19       pressure, and the like. Master device 502 may, therefore, modify each slave device 504a-  
20       504n or sub-slave device 506a-506n, whether individually or collectively, based upon the  
21       data received from the user. For example, if the user's heart rate is too high, master device  
22       502 may automatically reduce one or more operating parameters of the exercise device,  
23       such as speed, incline, resistance, and the like.

24

1       Although it is preferred that the communications performed according to the  
2 present invention (e.g., the first signal and the second signal) be in real time, it is also  
3 possible to achieve many objects of the present invention by engaging in communication  
4 other than real time.

5       According to one aspect of the present invention, an exercise device is disclosed  
6 that incorporates various audio/video features into the device or exercise device itself  
7 rather than having external audio/video features connected thereto. The exercise device  
8 may also include sensors that track the activity level of an individual on the exercise  
9 device, to determine whether an user is actually exercising or to determine whether the  
10 user is old enough to be using the exercise device.

11       According to another aspect of the present invention, one or more users are enabled  
12 to exercise in a group setting, while being distantly located one from another. Furthermore,  
13 the present invention enables home exercise equipment users to interact with trainers, other  
14 users, physical therapists, physicians, and the like in live-on-live workout sessions and, in  
15 some situations, allow a trainer, physical therapists, physicians, and the like to control at  
16 least one operating parameter of the exercise device upon which the user is training.

17       To enable the above-described communication, a user may access a communication  
18 system or module that facilitates communication between one or more users, trainers, or  
19 third parties. Such communication system or module may include at least one web site  
20 with associated web pages. As a user accesses the communication system or module,  
21 statistical information related to an individual's workout regime, such as how much time  
22 an individual spends on each various exercise device, the locations where they trained,  
23 when each user accesses the communication system or modules, and the like is gathered.

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1       Generally, the communication system or module, and hence the web site, may  
2 enable a user to access information and programming contained therein, while, in one  
3 embodiment, the communication system or module has the ability to control at least one  
4 operating parameter of the device or exercise device via the web site and web pages. In  
5 one case, when a user activates one or more input devices, such as a touch sensitive screen  
6 having a visual representation of the web page thereon, the communication system or  
7 module, via the web site, changes the operational parameters of the device or exercise  
8 device.

9       Various programming is accessible through communication system or module. For  
10 example, the user may select live or recorded programming. One type of programming or  
11 capability of the communication system or module relates to competitive motivational  
12 content. Such functionality allows an individual to compare the amount of miles traveled  
13 on an exercise device against individuals throughout the world engaging in similar  
14 activities. Therefore, competitors around the world may race against one another.  
15 Optionally, two or more users may link their exercise devices directly without the need to  
16 communicate through the communication system or module.

17       Another type of motivational content may include one or more electronic  
18 magazines or books that a user may download to view while exercising. Yet another type  
19 of motivational content or programming relates to the ability of the user to view an  
20 exercise profile representative of the exercise program currently being performed by the  
21 user. Such profile may be displayed to the user continuously, periodically, or other under  
22 the control of the user and/or the communication system or module. In one configuration,  
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1 the exercise profile may appear and overlay the visual image that the user is watching,  
2 whether the visual image is a television broadcast, webcast, or the like.

3 Another type of motivational content relates to various advertisements. During the  
4 exercise program a user may receive commercial advertising through an advertising banner  
5 that may continuously or periodically appear on the video display. Optionally, the  
6 advertisement may appear in a picture-in-picture advertisement that is delivered to the user  
7 as a micro-commercial that is displayed to the user and subsequently removed.

8 The programming received from the communication system or module may be live  
9 or recorded. In some situations the live programming received by the user may be too  
10 difficult or not difficult enough for the user of the exercise device. The present invention  
11 provides scaling controls that allow the user to scale the signals received from the  
12 communication system or module and/or the trainer. In this manner, the exercising user  
13 may increase or decrease the intensity of the exercise program. Such scaling may be  
14 achieved either at the user device, trainer device, the communication system or module, or  
15 at some other third party modules that may control the operation of the user's exercise  
16 device. By selecting a particular option on the web page, the user's appliance will be  
17 controlled according to the scaled choice. Optionally, the user may define a maximum  
18 limited for one or more of the operating parameters of the device, such that transmitted  
19 programming is limited in accordance with the maximum values defined for each operating  
20 parameter.

21 According to another aspect of the present invention, the systems, devices, and  
22 modules of the present invention enable bi-directional communication between one or  
23 more user devices and one or more trainer devices. The communication system or module  
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1 of the present invention may retrieve information from the devices and/or exercise devices  
2 and evaluated the operating parameters of the device and/or exercise device. The  
3 communication system or module may analyze any measurable parameter of the device or  
4 exercise device and may optionally analyze any measurable parameter of a user exercising  
5 using the exercise device. In response to this analysis, the communication system or  
6 module prescribes a particular action for the device or exercise device to perform, such as  
7 changing the speed of a treadmill, inclination of a treadmill, and the like.

8 According to yet another aspect of the present invention, the exercise device is  
9 capable of being controlled by signals from the communication system or module and/or  
10 controls physical controls integrated onto the device or exercise device. The physically  
11 integrated controls and the controls from the communication system or module may be  
12 passed through a buffer that controls the exercise device or device. In this way, in the  
13 event that connectivity to the communication system or module is lost, a user of the device  
14 or exercise device would still be capable of controlling the device or exercise device.

15 According to another aspect of the present invention, communication system or  
16 modules may remotely update various portions of a device or exercise device according to  
17 the need or direction of the user of the device or as determined by the communication  
18 system or module. For example, communication system or module may change any and  
19 all parameters related to the device or exercise device, such as the BIOS, or some other  
20 software.

21 According to another aspect of the present invention, the exercise device or device  
22 includes a diagnostic button. Upon activation of the diagnostic button, the internal  
23 hardware and/or software components of the device or exercise device, solely, or in

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1 combination with the communication system or modules tests and checks the various  
2 hardware and/or software modules, components, or elements of the device or exercise  
3 device. If any problems are found the internal hardware and/or software components of  
4 the device or exercise device, solely, or in combination with the communication system or  
5 modules attempt to fix the problems. Additionally, the diagnostic button may activate a  
6 downloading sequence to update information on the appliance with new software from a  
7 central database, such as at communication system or module.

8 According to another aspect of the present invention, the present invention may  
9 includes one or more interfaces that may communicate with existing hardware and/or  
10 software components of various existing devices and exercise devices. As such, those  
11 devices or exercise devices not currently capable of communicating with communication  
12 system or module, may be retrofitted with various hardware and/or software modules as  
13 described herein to allow the exercise device or device to communicate with the  
14 communication system or module.

15 As mentioned, the presently described systems, methods, and devices may be used  
16 in a master-slave system. In such a system, changes to the operating parameters of the  
17 master are translated to the operating parameters of the slave, thereby controlling the  
18 operation of the device or exercise device. For example, in a spinner class, upon activation  
19 of a more intense riding experience by the master, the slave spinners also give their riders a  
20 similarly intense riding experience. The master may selectively choose groups of  
21 participants based on various criteria, such as participant's heart rates, and change those  
22 participants exercise program, while maintaining other participants at the original or  
23 different exercise level.

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1. Embodiments of the present invention are also disclosed in copending United  
2 States Patent Applications entitled (i) Computer Systems and Methods for Interaction with  
3 Exercise Device, to Scott R. Watterson, William T. Dalebout and Darren C. Ashby, filed  
4 August 18, 2000, which is incorporated herein in its entirety by reference; and (ii) Systems  
5 and Methods for Interaction with Exercise Device, to Scott R. Watterson, William T.  
6 Dalebout and Darren C. Ashby, filed August 18, 2000, which is incorporated herein in its  
7 entirety by reference.

8 As used in this specification and the appended claims, the phrases "communicating  
9 with," and "in communication with" and similar phrases shall mean any type of applicable  
10 communication known to one skilled in the art in light of the disclosure herein, such as  
11 electrical communication, optical communication, physical communication, magnetic  
12 communication, software communication, hardware communication, data communication,  
13 and the like.

14 The present invention may be embodied in other specific forms without departing  
15 from its spirit or essential characteristics. The described embodiments are to be considered  
16 in all respects only as illustrative and not restrictive. The scope of the invention is,  
17 therefore, indicated by the appended claims rather than by the foregoing description. All  
18 changes which come within the meaning and range of equivalency of the claims are to be  
19 embraced within their scope.

20 What is claimed and desired to be secured by United States Letters Patent is: